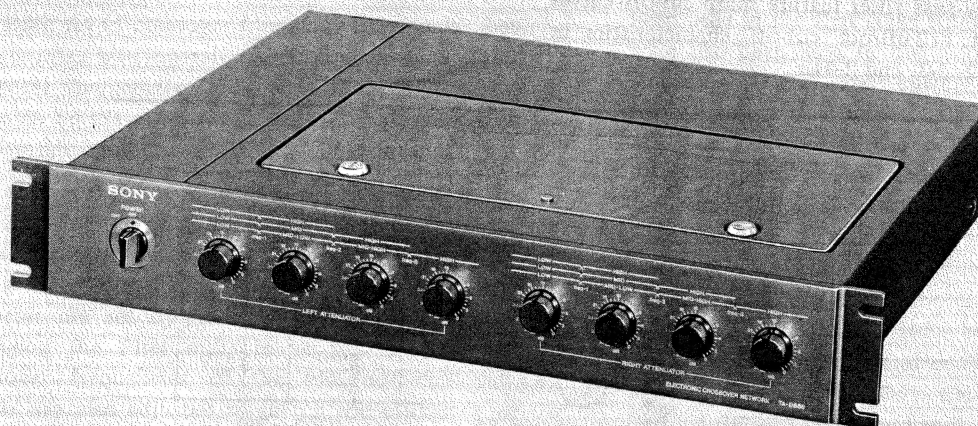


TA-D88B

Canadian Model
AEP Model



ELECTRONIC CROSSOVER NETWORK

General

SPECIFICATIONS

Power Requirements: 120 V ac~, 60 Hz (Canadian Model)
110 V, 120 V, 220 V, or
240 V ac~, 50/60 Hz (AEP model)

Power Consumption: 20 watts

Dimensions: Approx.
480 (w) x 80 (h) x 365 (d) mm
18 1/8 (w) x 3 1/8 (h) x 14 3/8 (d) inches
Including projection parts and controls.

Weight: Approx. 7.4 kg, 16 lb 5 oz, net
Approx. 9.5 kg, 20 lb 15 oz, in shipping
carton

System: Filter characteristics: 24 dB-per-octave
Bessel function high-pass and low-pass
Buffer amp: DC amp

Crossover Frequency: UNIT 1: 140 Hz, 225 Hz, 280 Hz
UNIT 2: 500 Hz, 800 Hz, 1 kHz
UNIT 3: 1.25 kHz, 2 kHz, 2.5 kHz
UNIT 4: 5 kHz, 8 kHz, 10 kHz

Bandpass Gain: 0 dB

Inputs: 1 volt rated/7 volts maximum, 50 k ohms

Outputs: 1 volt rated/7 volts maximum, 100 ohms

Harmonic Distortion: Less than 0.003 % at 1 volt output
Less than 0.005 % at 5 volts output

Signal-to-Noise Ratio: Better than 110 dB (1 volt rated input, short-
circuited input, weighting network A)

Frequency Response: DC—100 kHz $\begin{smallmatrix} +0 \\ -1 \end{smallmatrix}$ dB

ATTENTION AU COMPOSANT AYANT RAPPORT
À LA SÉCURITÉ !

LES COMPOSANTS IDENTIFIÉS PAR UN TRAMÉ ET
UNE MARQUE \triangle SUR LES DIAGRAMMES SCHÉ-
MATIQUES, LES VUES EXPLOSÉES ET LA LISTE
DES PIÈCES SONT CRITIQUES POUR LA SÉCURITÉ
DE FONCTIONNEMENT. NE REMPLACER CES
COMPOSANTS QUE PAR DES PIÈCES SONY DONT
LES NUMÉROS SONT DONNÉS DANS CE MANUEL
OU DES SUPPLÉMENTS PUBLIÉS PAR SONY.

SAFETY-RELATED COMPONENT WARNING !!

COMPONENTS IDENTIFIED BY SHADING AND \triangle
MARK ON THE SCHEMATIC DIAGRAMS, EXPLODED
VIEWS AND IN THE PARTS LIST ARE CRITICAL TO
SAFE OPERATION. REPLACE THESE COMPONENTS
WITH SONY PARTS WHOSE PART NUMBERS APPEAR
AS SHOWN IN THIS MANUAL OR IN SUPPLEMENTS
PUBLISHED BY SONY.

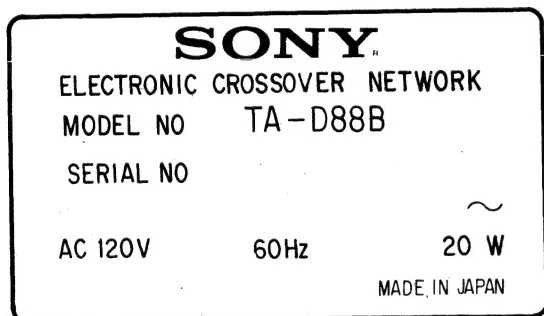
SONY®

SERVICE MANUAL

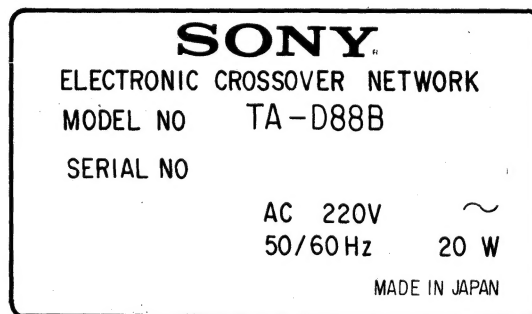
• **MODEL IDENTIFICATION**

— Specification Label —

Canadian model



AEP model



SECTION 1

OUTLINE

1-1. CIRCUIT DESCRIPTION

The TA-D88B is an electronic crossover network designed for use in multi-amplifier stereo systems. The input audio signal is divided into a number of different frequency bands, each band being amplified independently and passed on to individual speakers. See fig. 3 for an outline of the circuit diagram.

Each set of crossover frequency filters have been incorporated into separate plug-in type units. Suitable crossover frequencies for a wide range of speakers available on the market may be set by plugging in an appropriate combination of the 4 different units.

The crossover frequency of each unit is determined by the capacitance of the filters, and the frequency selector switches S1-S4. For 2-way to 4-way multi-amplifier systems, the crossover frequencies are set by adjusting S1-S4, and by rearranging the filter units in accordance with the crossover frequencies of the speakers employed. Levels are also adjusted to match the efficiency of each speaker.

Note that the following description refers to a 4-way multi-amplifier system.

1. Pre-buffer Amplifier Stage (see Fig. 1)

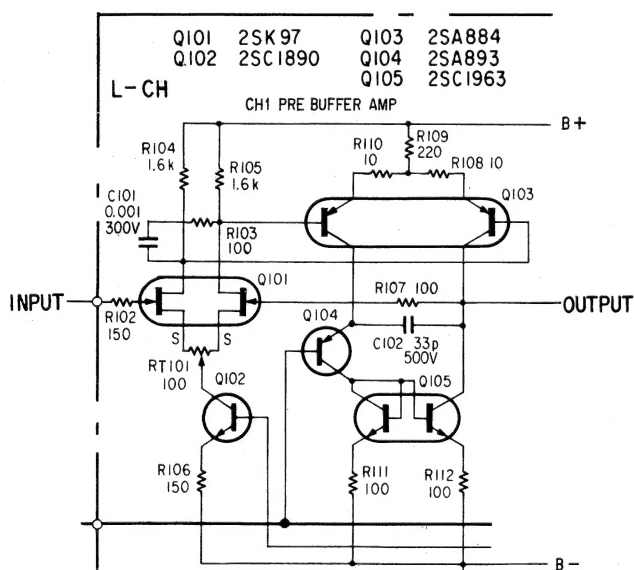


Fig. 1

The purpose of the pre-buffer amplifier (Q101-Q105) is to eliminate the influence of the preamplifier and connecting cord upon the filters. With 100% negative feedback applied to the first-stage differential amplifier (Q101) by resistor R107 (100Ω), the pre-buffer amplifier has high input impedance and low

output impedance. In addition, a current-mirror loaded 2-stage differential amplifier structure reduces distortion to a very low level. Furthermore, in order to make the low channel amplifier a pure DC amplifier employing no coupling capacitors, a dual FET differential amplifier which suppresses DC drift has been used in the first stage (Q101). Dual transistors have also been used in the second stage differential amplifier (Q103) and current mirror (Q105) to further suppress DC drift. By connecting the base of Q104 to ground, the collector voltage of the PNP transistor on the left hand side of Q103 is reduced to almost 0V, thereby equalizing the collector voltage of both PNP transistors in Q103. The dual transistor Pc (power input dc to collector) are therefore very much the same, resulting in the amount of drift in both sides being balanced. The impedance-converted signal is then passed from the pre-buffer amplifier to CH1-CH4 where it is divided into 4 different frequency bands.

2. LOW Channel Stage (CH-1)

The low-pass filters employed in this stage achieve a very sharp cut-off slope of 24 dB/oct (12 dB/oct at filter 1-1 and again at filter 1-2). (See Fig. 3-1).

Each low-pass filter buffer amplifier has a high input impedance and low output impedance current-mirror loaded 2-stage differential amplifier, similar to the pre-buffer amplifier (Q101-Q105). The crossover frequency is selected by the freq-1 switch (S1), thereby defining the f_1 frequency band.

The filter output signal is then passed via the level adjustment control (RV601) on to the output buffer amplifier (Q106-Q110) where the impedance is again converted, and finally appearing on the J102 output terminal. The role of this output buffer amplifier is not to change the crossover-frequency and the input impedance of the power amplifier.

3. MID-LOW Channel Stage (CH-2)

The signal whose impedance was converted in the pre-buffer amplifier is narrowed down to a frequency band between f_1 and f_2 according to the freq-1 and freq-2 settings (see Fig. 3-2). Both the high-pass filter and low-pass filter feature sharp cut-off curves of 24 dB/oct (12 dB/oct cut-off characteristics in filters 2-1, 2-2, 2-3, and 2-4).

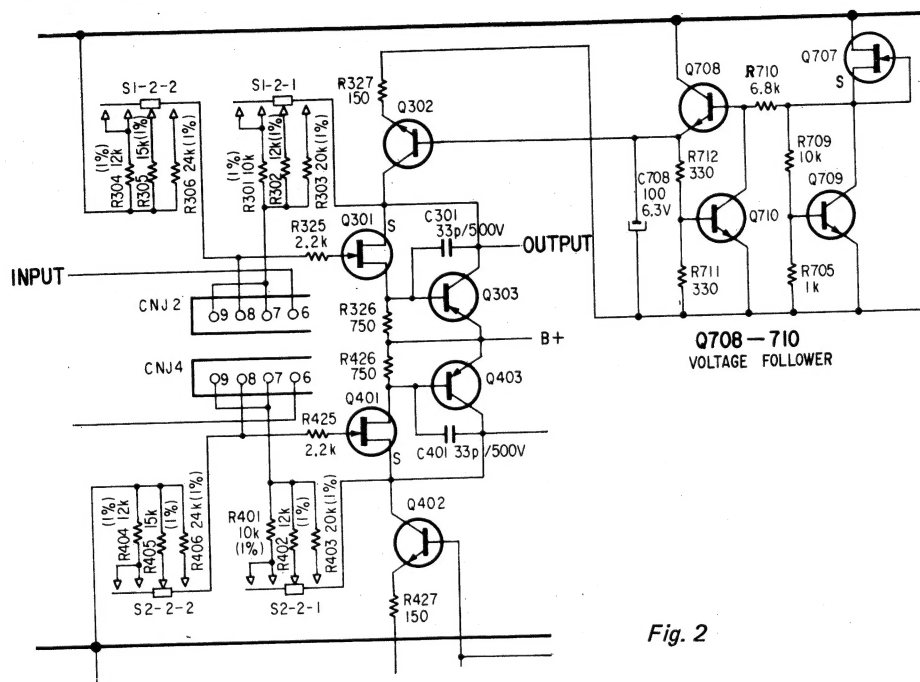


Fig. 2

The basic circuitry employed in the buffer amplifiers in each of the filters in the MID-LOW channel stage is outlined in Fig. 2. Each of these buffer amplifiers are hybrid type source-follower amplifiers employing PNP transistors and FETs designed for high frequency circuits. By connecting the collector of Q303 to the source of the high frequency FET, a 100% negative feedback is applied for high input impedance and low output impedance. The load for this amplifier is Q302. And since it is a constant current load, there is very little distortion, and no interference from the filter unit power supplies. The bias applied to the base of Q302 is stabilized by Q707-Q710.

Since there is no need to operate the MID-LOW channel stage anywhere near the DC region, coupling capacitors have been employed prior to the RV602 control and the output terminals, thereby suppressing DC offset. The capacitor employed in front of RV602 consists of a tantalum capacitor (C305) connected in parallel with a film capacitor (C306), and has been inserted in order to prevent deterioration of sound quality.

The MID-LOW channel stage employs an output buffer amplifier (Q111-Q113) in the output stage for the same reason as the LOW channel stage.

4. MID-HIGH Channel Stage (CH-3)

The MID-HIGH channel stage employs the same basic circuit structure as the MID-LOW channel stage. The frequency band between the f_2 and f_3 crossover frequencies is set by the freq-2 and freq-3 switch positions (see Fig. 3-3).

5. HIGH Channel Stage (CH-4)

The circuitry of this stage is basically the same as the high-pass filter and output buffer amplifier employed in the MID-HIGH channel stage. The frequency band is determined by the f_3 crossover frequency set by the freq-3 switch position (see Fig. 3-4).

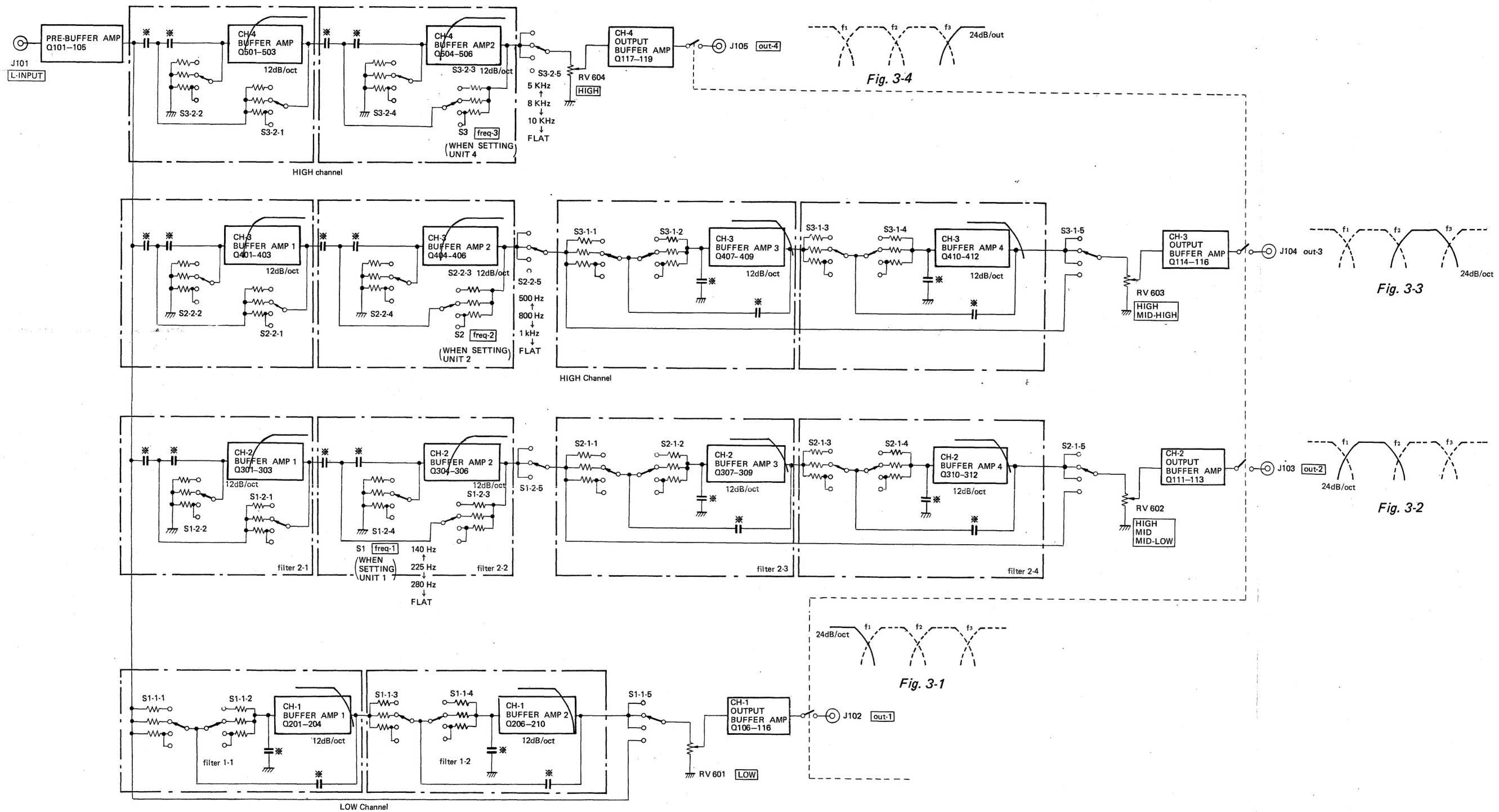


Fig. 3

The capacitance values marked * are decided by setting the units 1 to 4.

6. Muting Circuit (Fig. 4)

By activating a relay circuit, the muting circuit disconnects the signal line, and thereby prevents the appearance of any signals at the output terminals when the power switch is turned on and off. The "pop" noises generated at this time are therefore completely silenced. Note that this muting circuit is designed to close the signal line when the muting relays (RY1-RY8) are "on".

In addition, whenever the frequency response select cover is opened to exchange filter units, S7 is switched off, and again preventing the appearance of any signals at the output terminals.

1) When the power switch is turned on

- (a) As soon as the power switch is turned on, both B+ and B- will commence to “charge up”. C810 will also commence to charge up, requiring 2 to 3 seconds (as determined by the R803/C810 time constant) to be fully charged. During this period Q801 and Q802 will remain off, thereby keeping the muting relays (RV1–RV8) off as well. Therefore, no signals will appear at the output

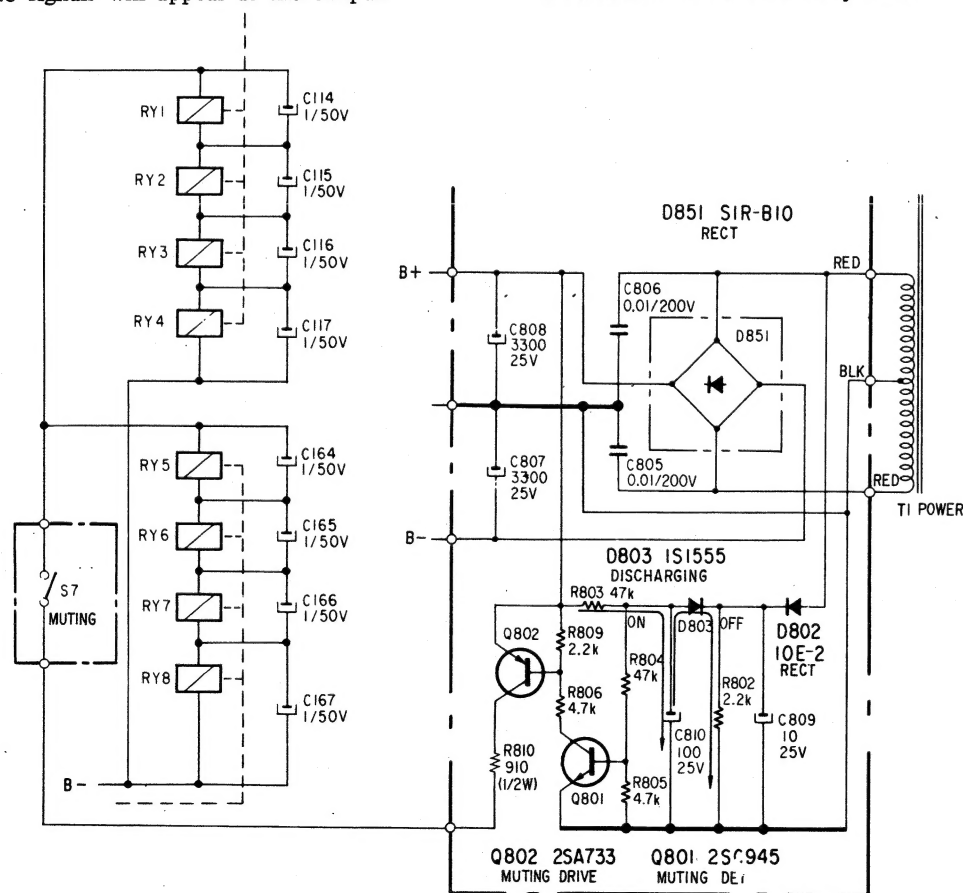


Fig. 4

terminals, effectively muting out the power switching noise.

- (b) 2 to 3 seconds after turning the power switch on, the potential on the base of Q801 reaches "on" potential, resulting in this transistor turning on.
- (c) As soon as Q801 is turned on, Q802 is also turned on, resulting in muting relays (RY1—RY8) being turned on, and the output signals appear at the output terminals.

2) When the power switch is turned off

- (a) At the same time that the power switch is turned off, the positive potential which had been applied to the cathode of D803 via D802 decreases, resulting in the D803 diode being turned on by the forward biasing.
- (b) The charge on C810 is consequently discharged via D803 and R802, resulting in Q801 and Q802 both being turned off. The muting relays are also turned off, preventing any output signals from appearing at the output terminals. The "pop" noise generated when the power switch is turned off is also effectively muted.

- 3) When the frequency response select cover is opened (Fig. 5).

When the frequency response select cover is opened, S7 is turned off, thereby cutting off the voltage being applied to the muting relays (RY1-RY8). These relays are therefore turned off, and no signals will appear at the output terminals. So none of the noise generated when exchanging units will reach the speakers.

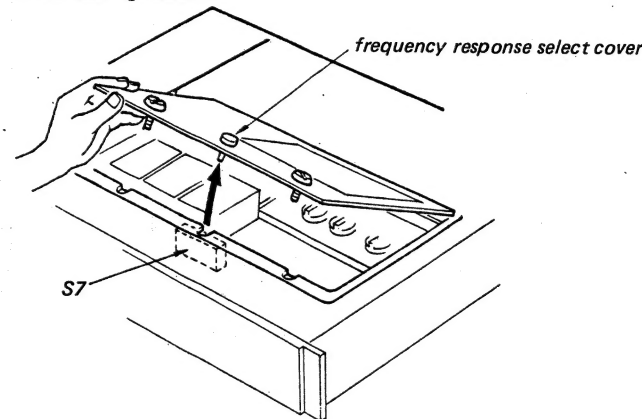
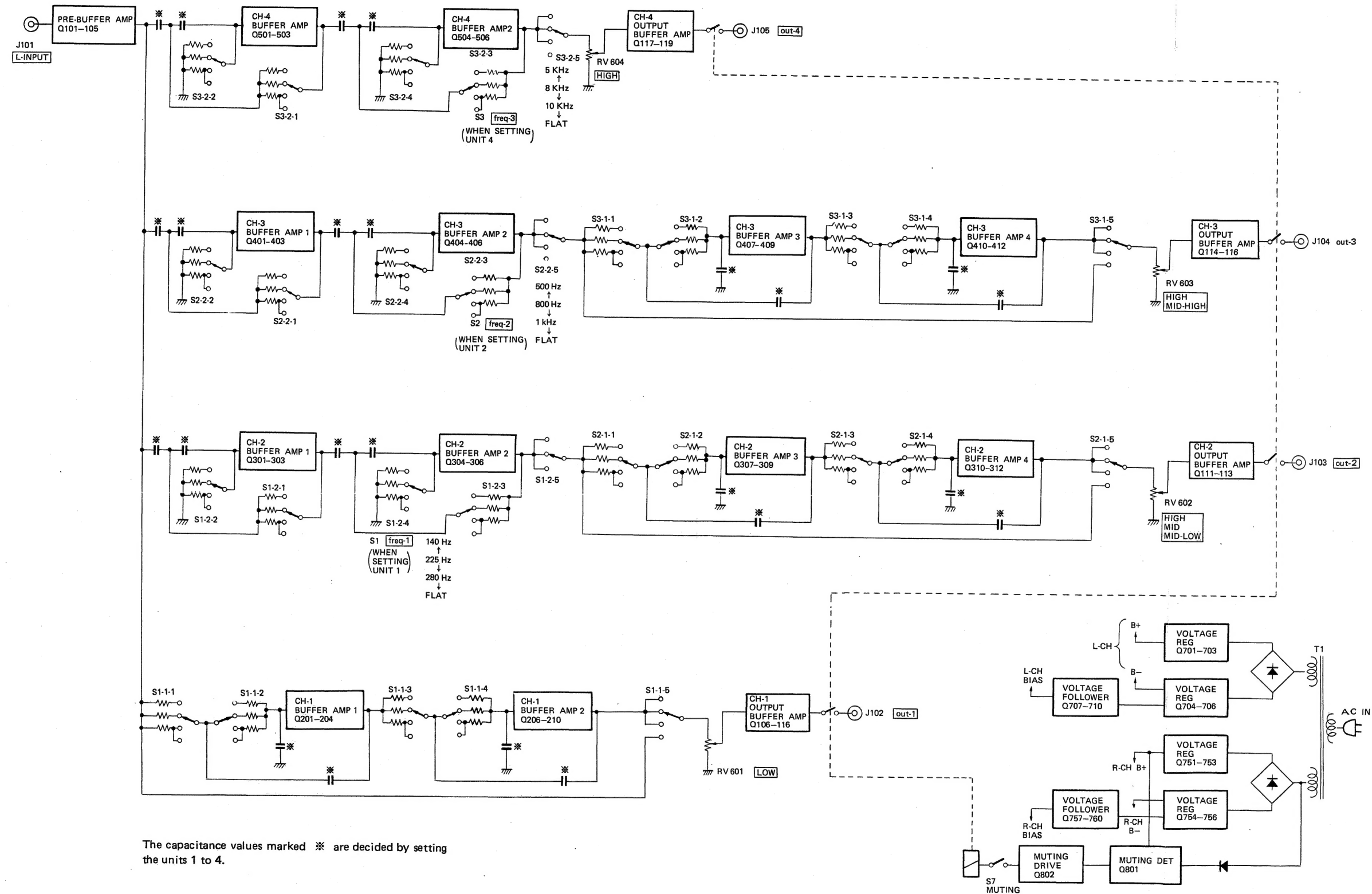


Fig. 5

1-2. BLOCK DIAGRAM



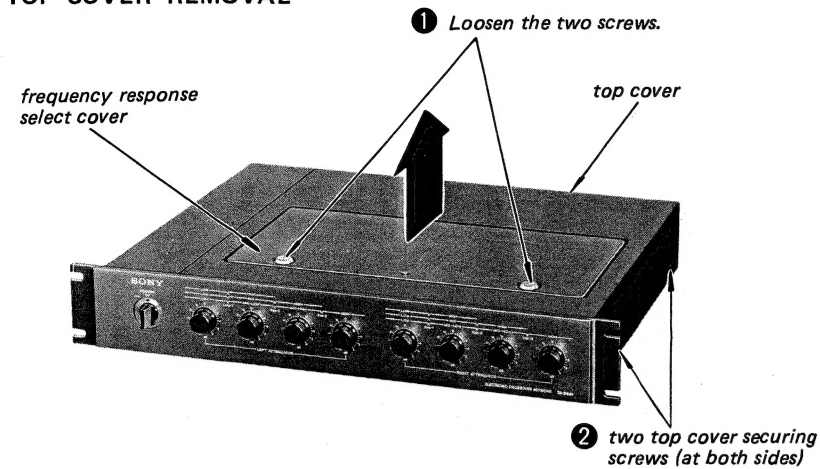
The capacitance values marked * are decided by setting the units 1 to 4.

SECTION 2 DISASSEMBLY

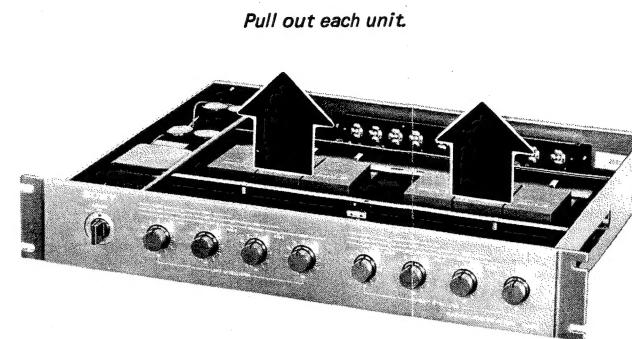
2-1. REMOVAL

Note: Follow the disassembly procedure in the numerical order given.

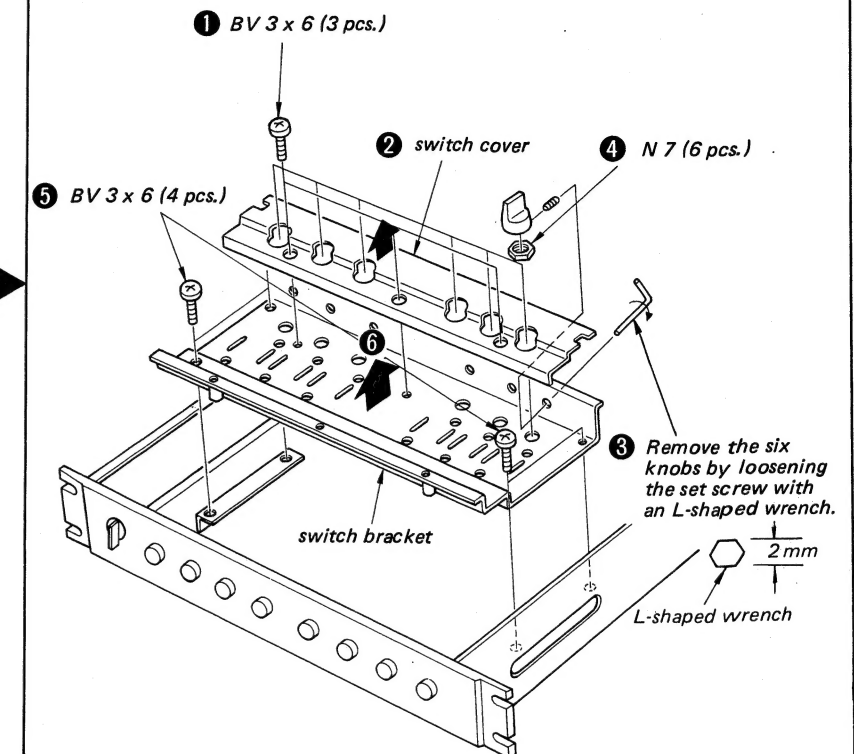
TOP COVER REMOVAL



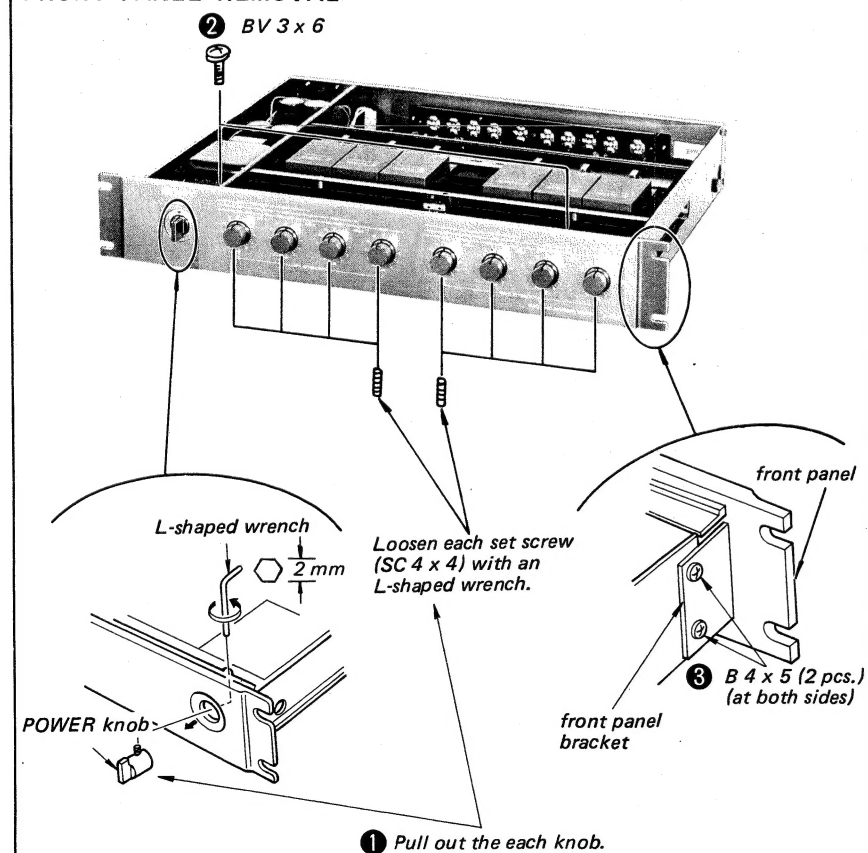
UNIT REMOVAL



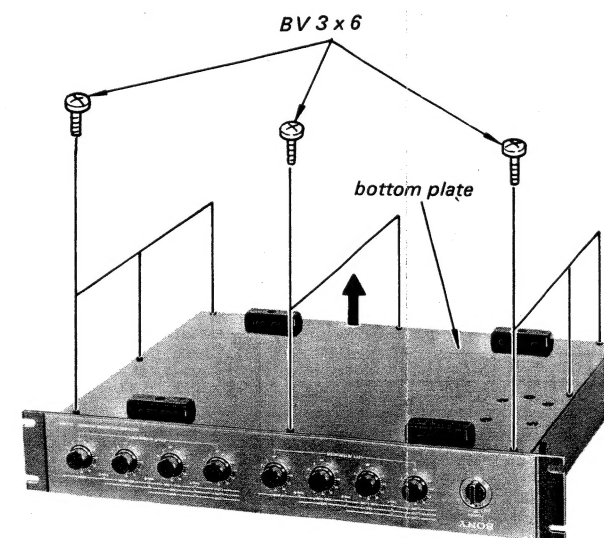
SWITCH COVER AND SWITCH BRACKET REMOVAL



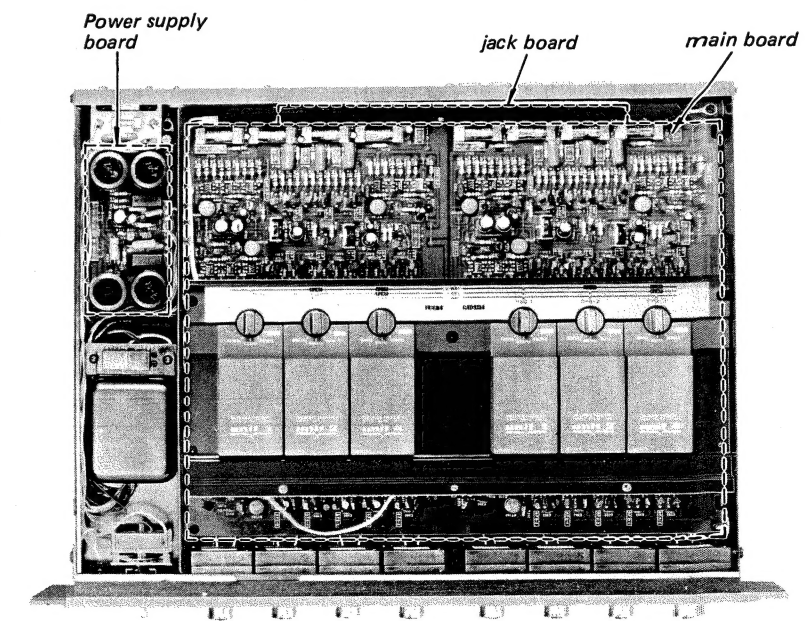
FRONT PANEL REMOVAL



BOTTOM PLATE REMOVAL



Each circuit board can be checked.



SECTION 3

ADJUSTMENTS

OFFSET ADJUSTMENT

• Settings

POWER switch: ON

LEFT, RIGHT ATTENUATOR: 0 dB (MAX)

• Procedure

1. Short-circuit both INPUT jacks.
2. Adjust each adjustable resistor in the numerical order (① - ④) so that the VOM reads 0 V at each test point (TP1-8).

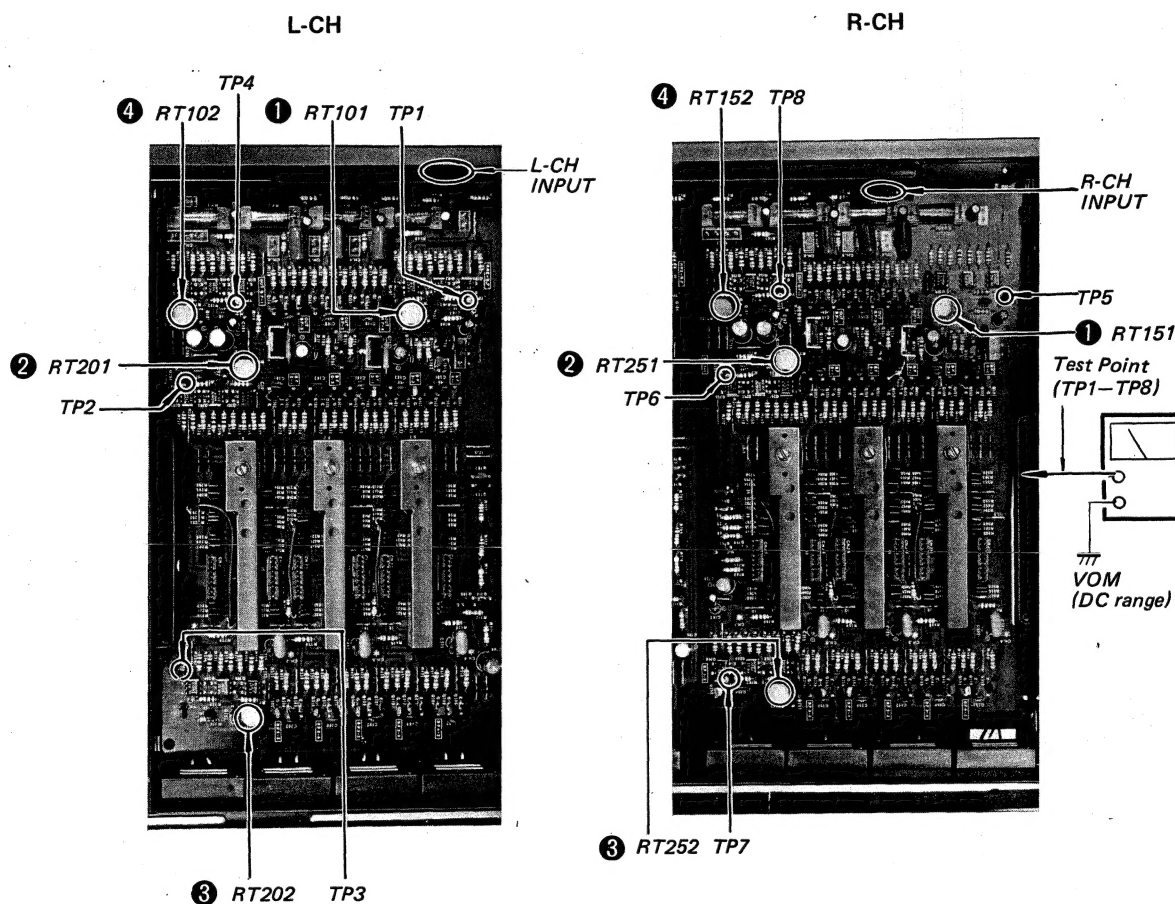
L-CH

- ① RT101 (TP1)
- ② RT201 (TP2)
- ③ RT202 (TP3)
- ④ RT102 (TP4)

R-CH

- ① RT151 (TP5)
- ② RT251 (TP6)
- ③ RT252 (TP7)
- ④ RT152 (TP8)

Specification: $0\text{ V} \pm 0.1\text{ mV}$



MUTING TIME CHECK

Check the operation of each relay (RY1-RY8).

1. POWER Switch ON

Two or three seconds after turning the power switch on, RY1-RY8 are energized.

2. POWER Switch OFF

RY1-RY8 are released at the moment POWER switch is turned off.

MEMO

Handwriting practice lines consisting of a solid top line and a dotted bottom line, forming a series of horizontal bands for text entry.

SECTION 4 DIAGRAMS

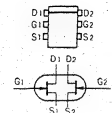
4-1. MOUNTING DIAGRAM

— Conductor Side —

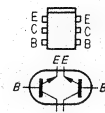
• Replacement Semiconductors

For replacement, use semiconductors except in ().

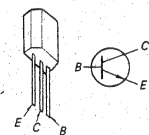
Q101, 151
Q106, 156
Q201, 251
Q206, 256 : 2SK97



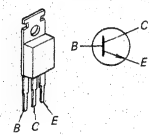
Q105, 155
Q110, 160
Q205, 255
Q210, 260 : 2SC1963



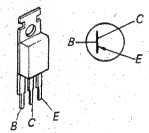
Q102, 152
Q107, 157
Q112, 162
Q115, 165
Q118, 168
Q202, 252
Q207, 257
Q302, 352
Q305, 355
Q308, 358
Q311, 361
Q402, 252
Q405, 455
Q408, 458
Q411, 461
Q502, 552
Q505, 555
Q703, 753
Q708, 758
Q709, 759
Q710, 760 : 2SC926A



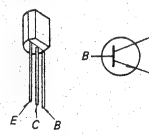
Q701, 751 : 2SC1173



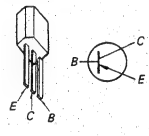
Q706, 756 : 2SA473



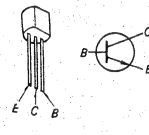
Q801 : 2SC1364 (2SC945)



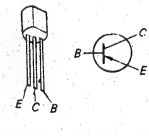
Q802 : 2SA678



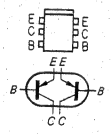
(2SC1890)



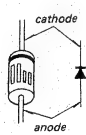
(2SA733)



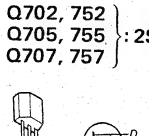
Q103, 153
Q108, 158
Q203, 253
Q208, 258 : 2SA884



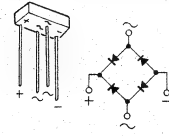
D701, 751 : EQB01-16 (EQA01-16R)
D702, 752 : EQB01-16 (EQA01-16R)



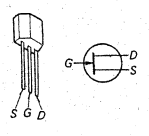
Q111, 161
Q114, 164
Q117, 167
Q301, 351
Q304, 354
Q307, 357
Q310, 360
Q401, 451
Q404, 454
Q407, 457
Q410, 460
Q501, 551
Q504, 554 : 2SK42-4 (2SK42)



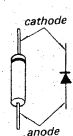
D801, 851 : S1RB10



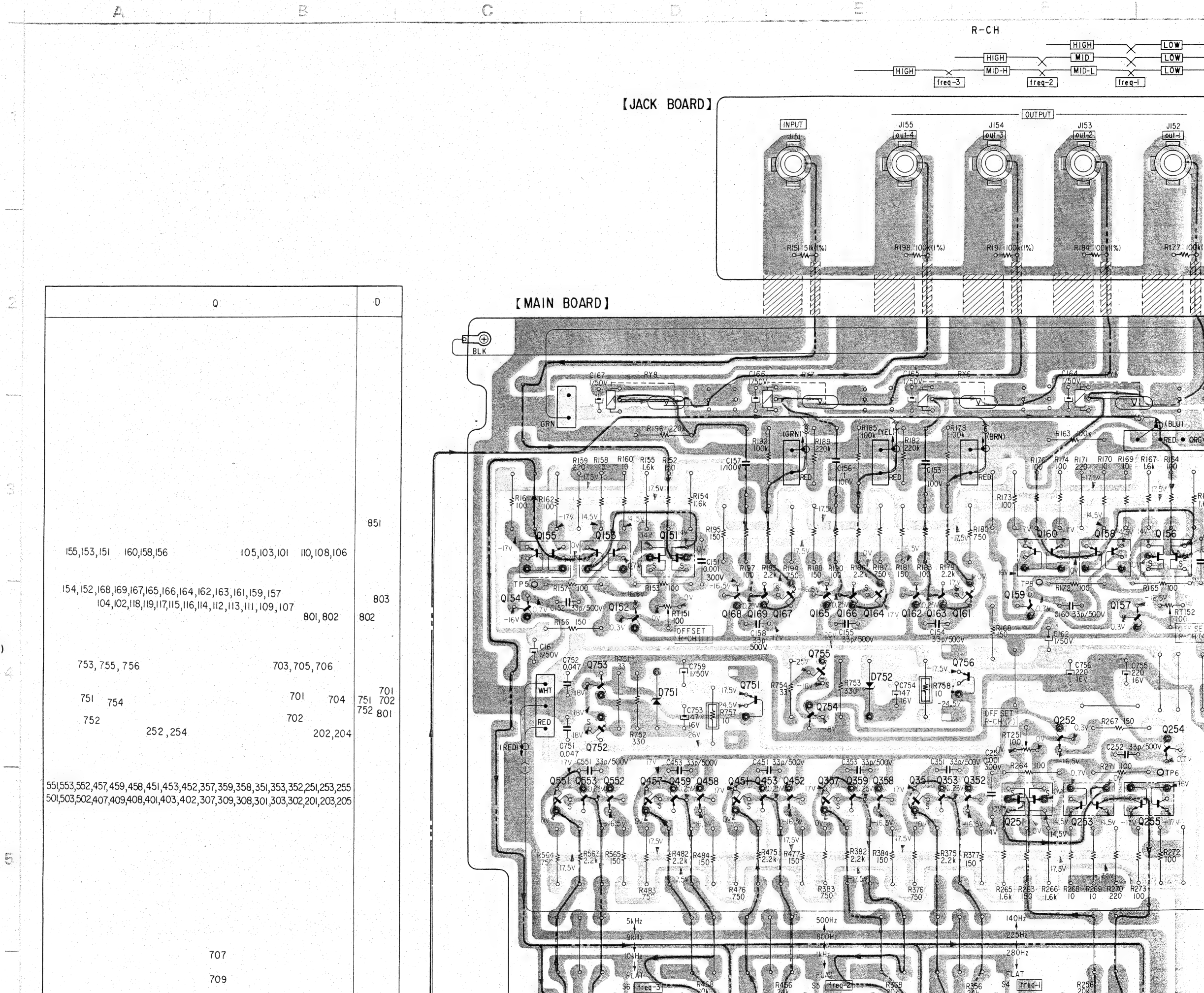
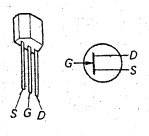
Q702, 752
Q705, 755
Q707, 757 : 2SK42-2 (2SK42)

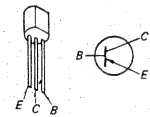


D802 : 10E2
D803 : 1S1555






Q104, 154
Q109, 159
Q113, 163





Note:

- ○ — : parts extracted from the component side.
- ● — : parts extracted from the conductor side.
-  — : nonflammable resistor.
-  : B + pattern
-  : B - pattern

707

709

757

759

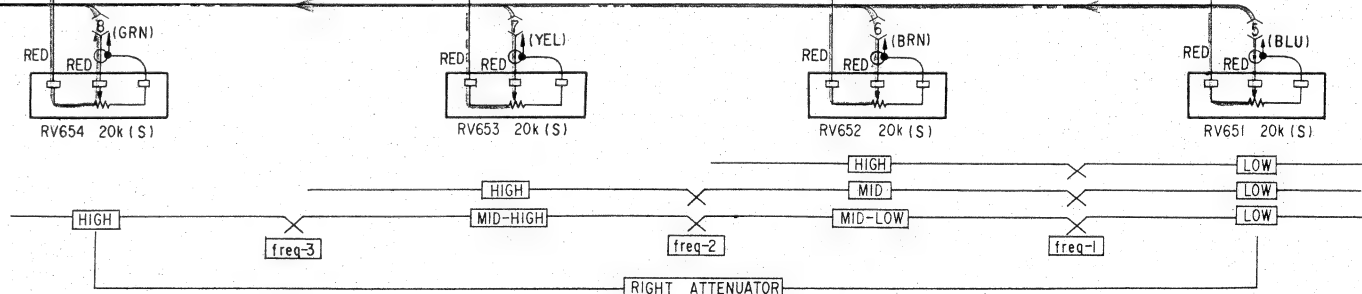
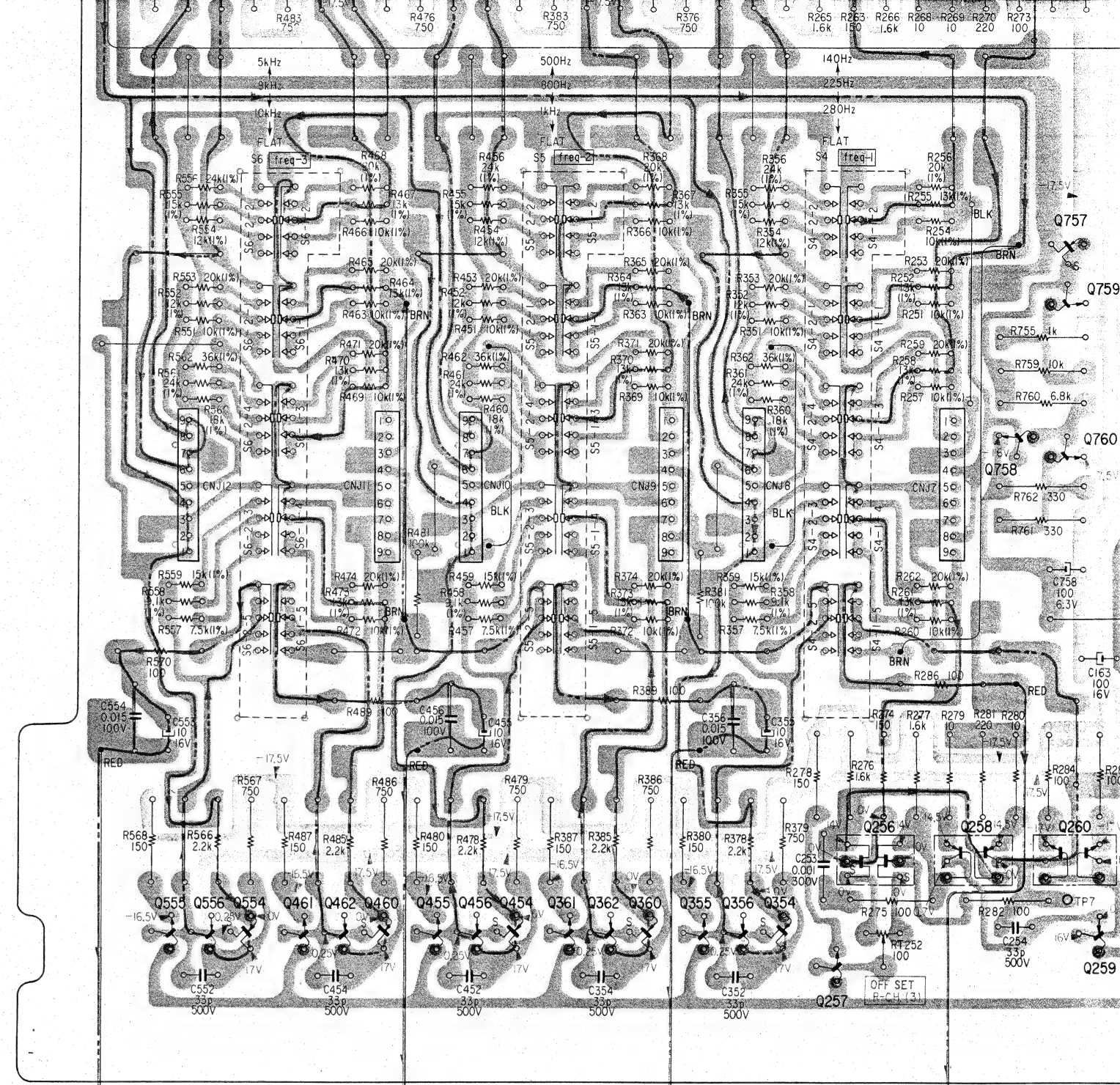
758 760


710,708

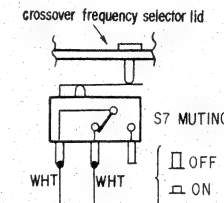
256, 258, 260

206, 208, 210

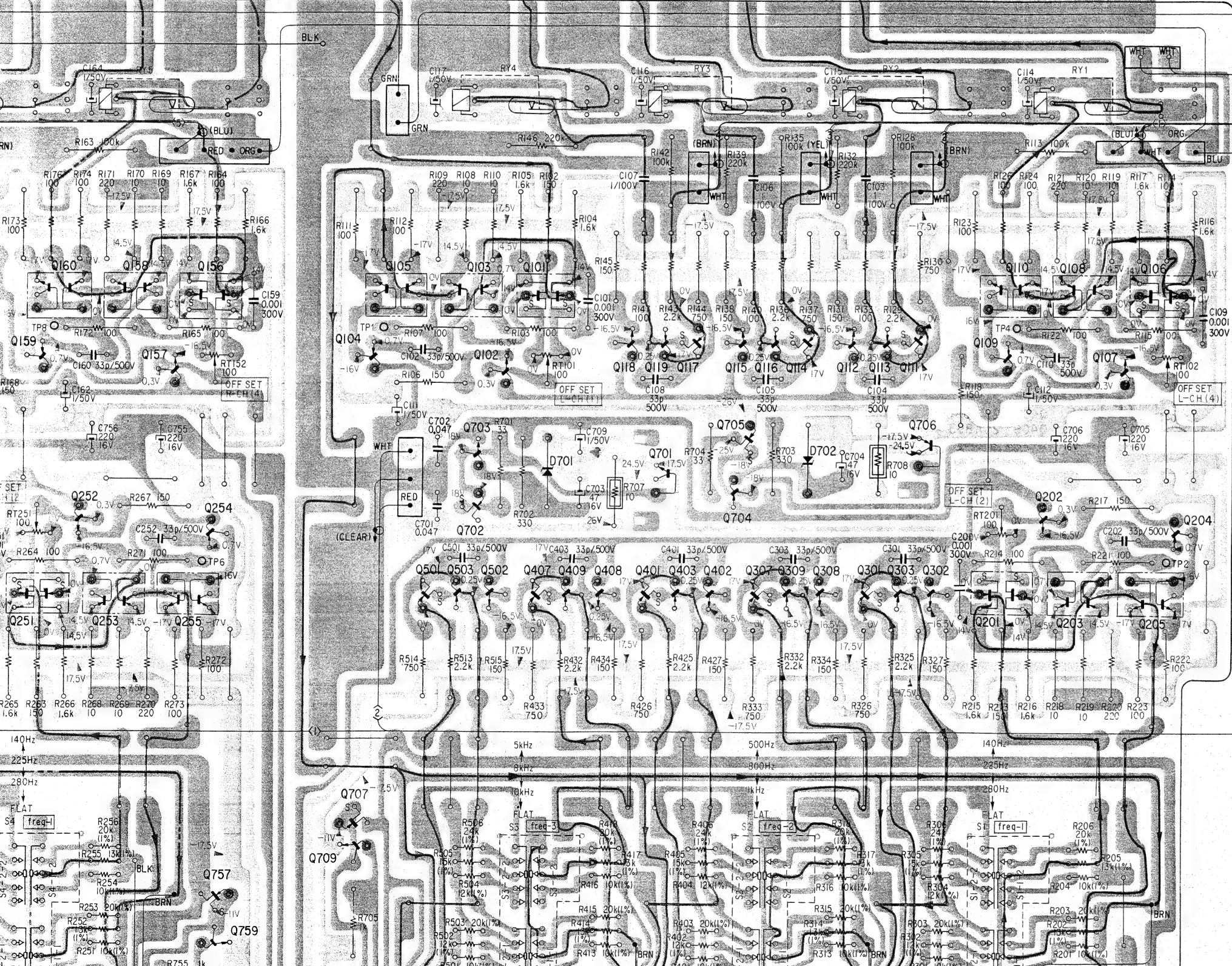
555,556,554,461,462,460,455,456,454,361,362,360,355,356,354,257,259
505,506,504,411,412,410,405,406,404,311,312,310,305,306,304,207,209



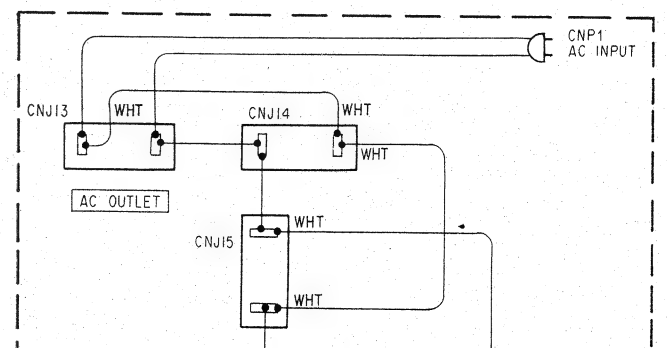
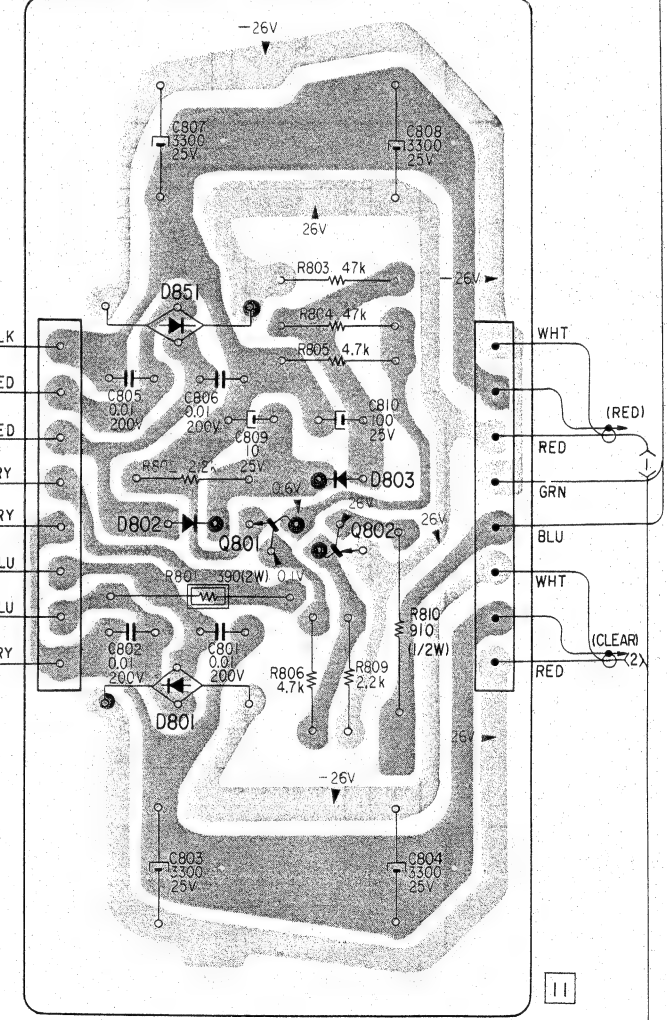
Note: The portions marked  are connected by soldering.

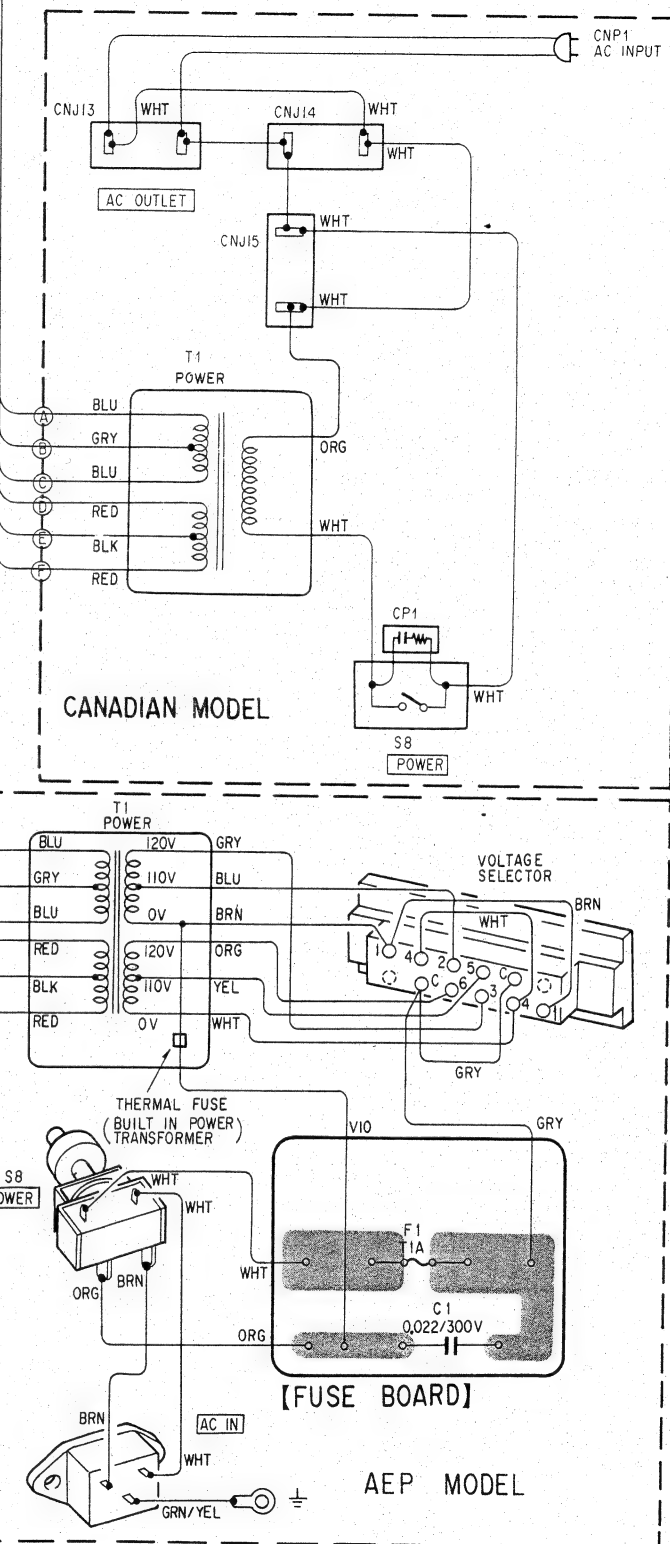
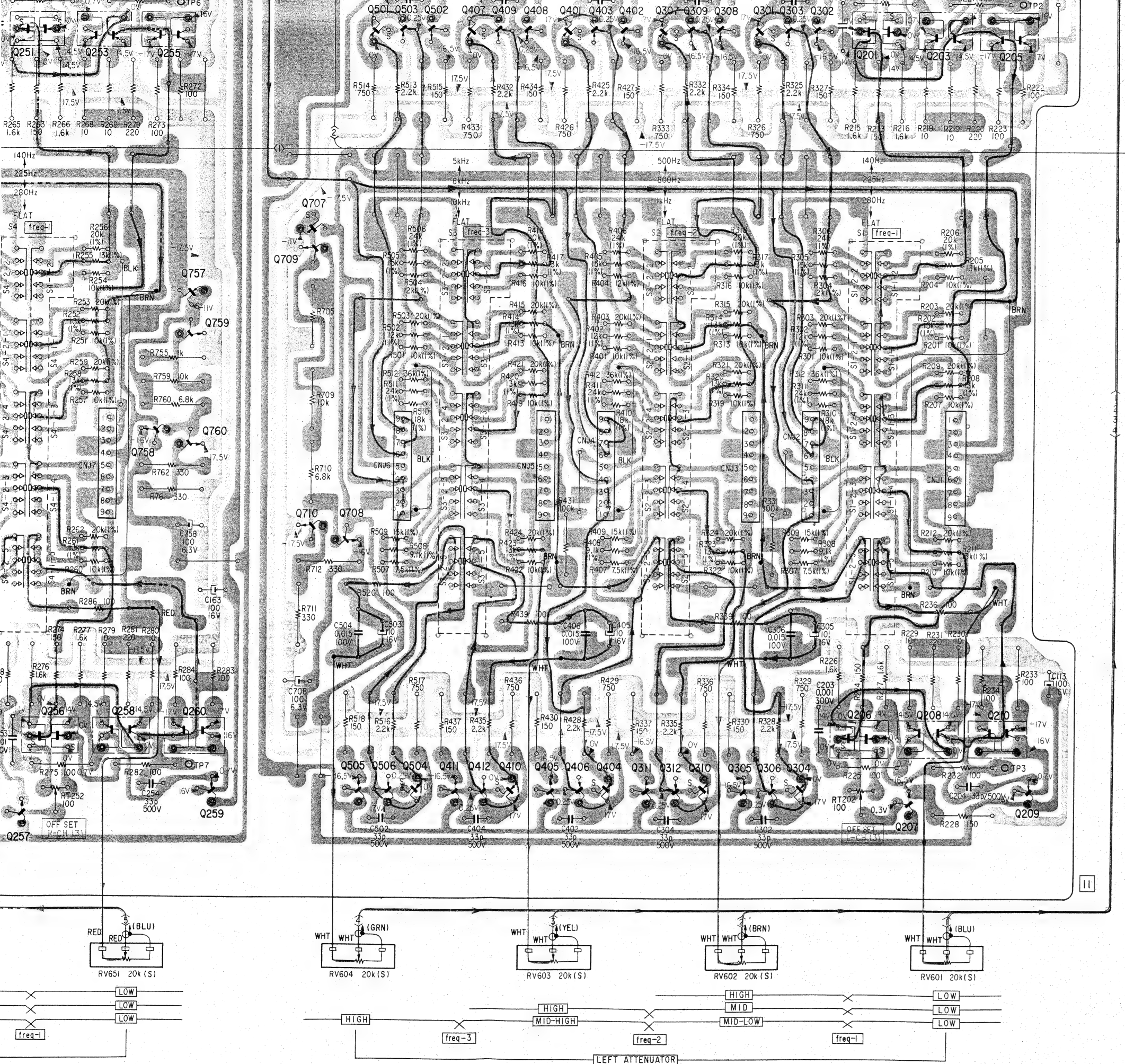


The input signal is muted by removing the crossover frequency selector lid. This is because S7 is turned off.

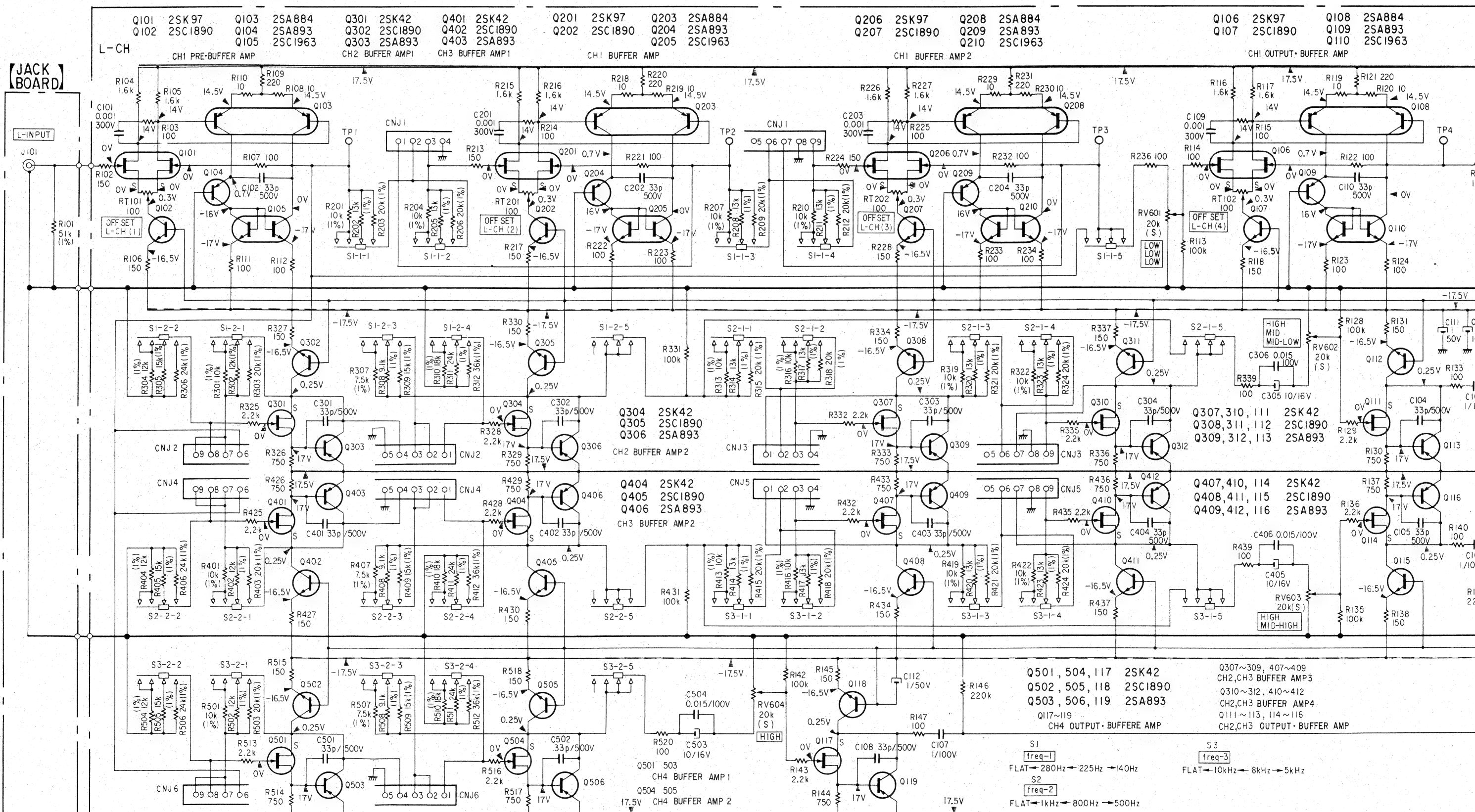
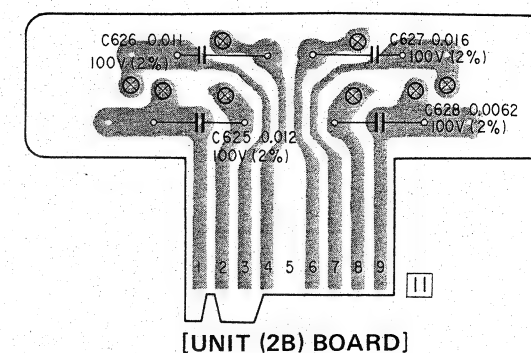
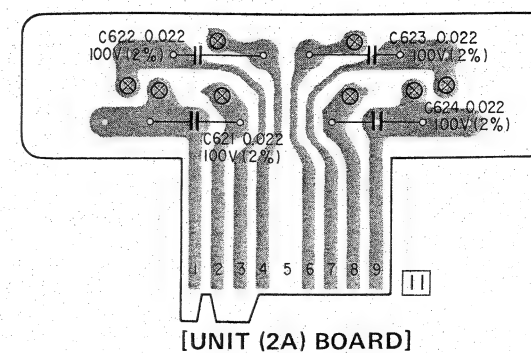
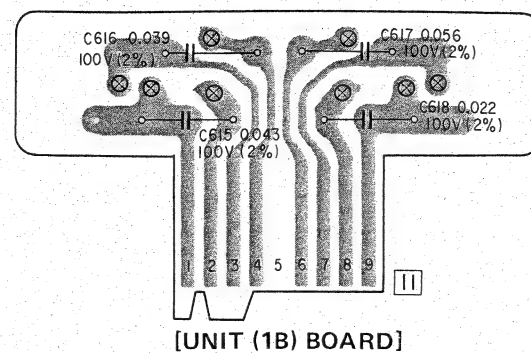
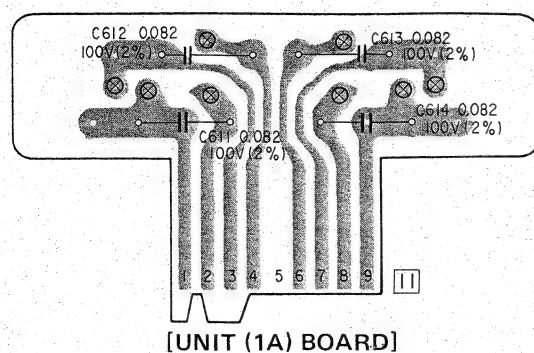


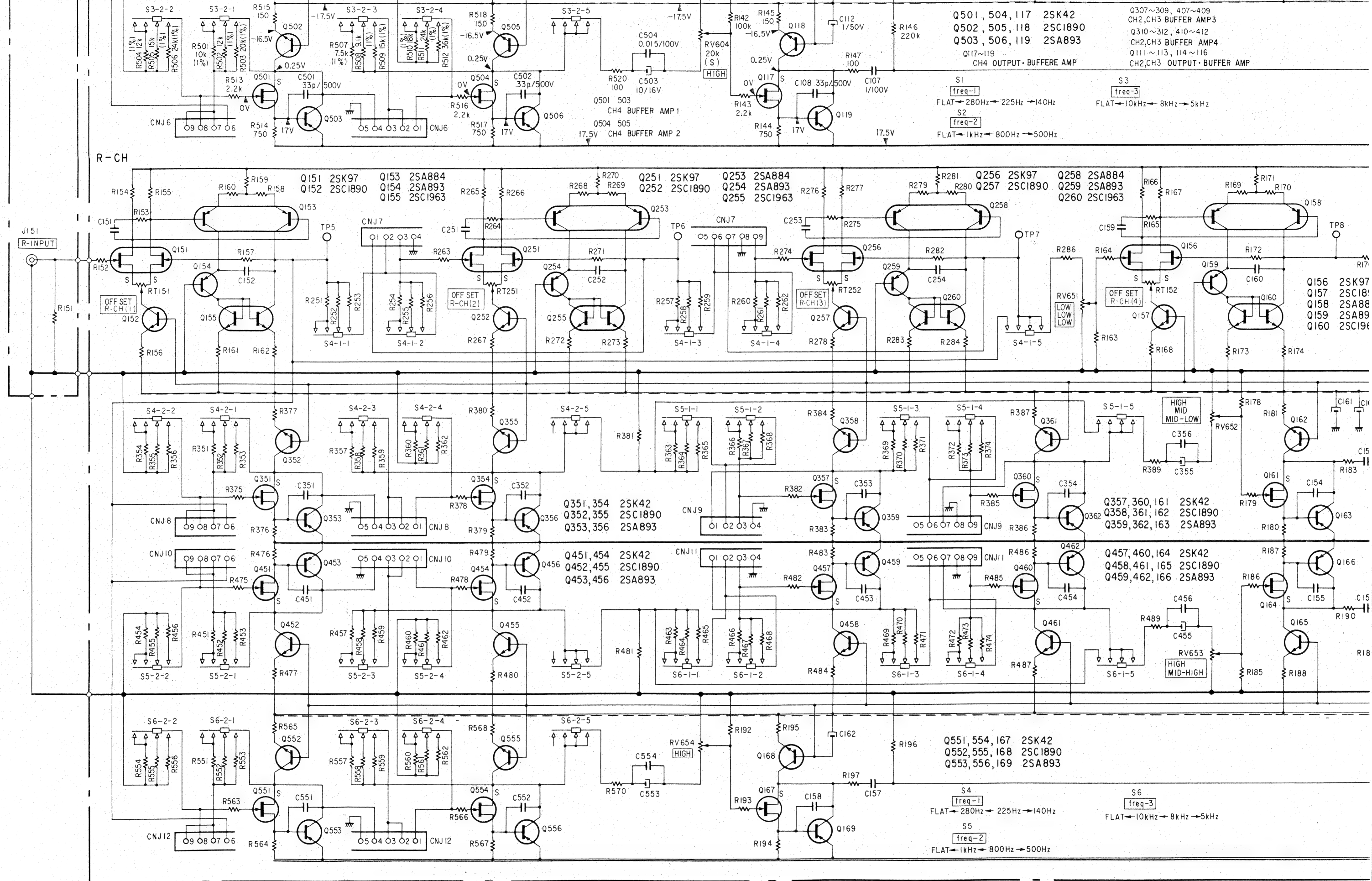
【POWER SUPPLY BOARD】

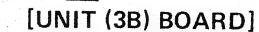
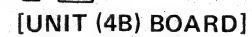
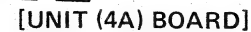
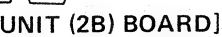




4-2. SCHEMATIC DIAGRAM



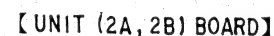




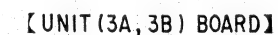
K97	Q108	2SA884
C1890	Q109	2SA893
	Q110	2SC1963
OUTPUT - BUFFER AMP		



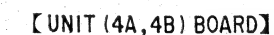
CROSSOVER FREQUENCY
140Hz
225Hz
280Hz



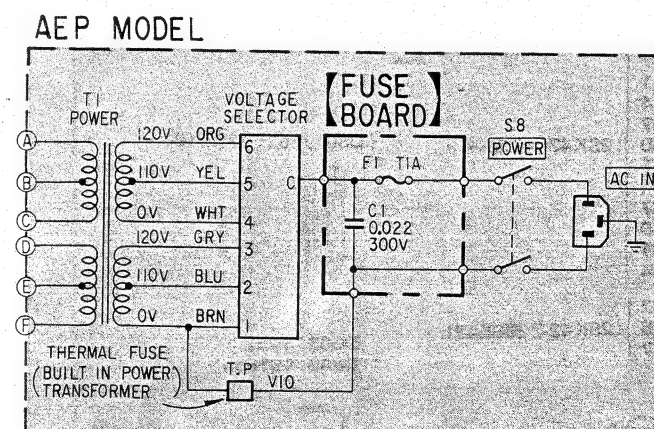
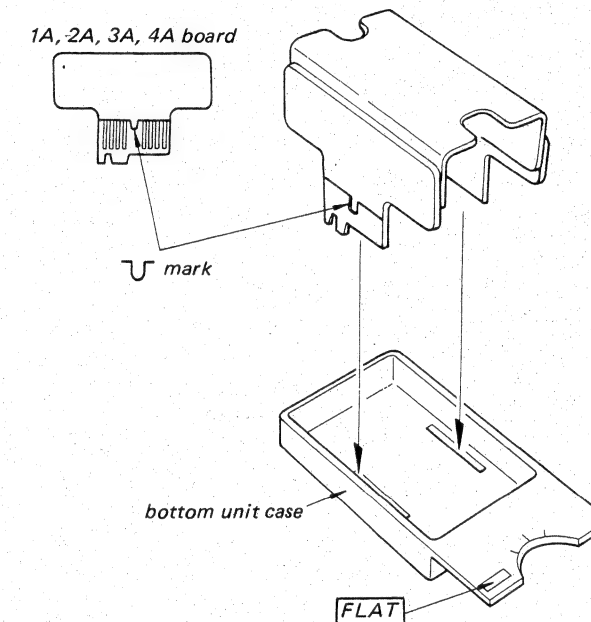
CROSSOVER FREQUENCY
500Hz
800Hz
1kHz

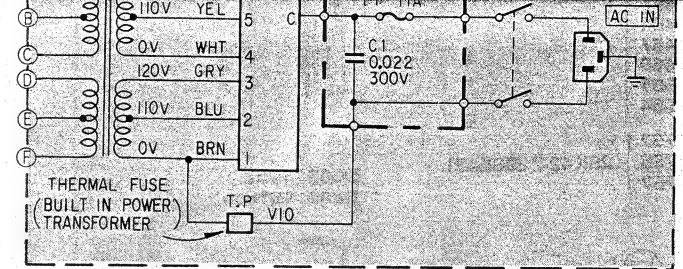
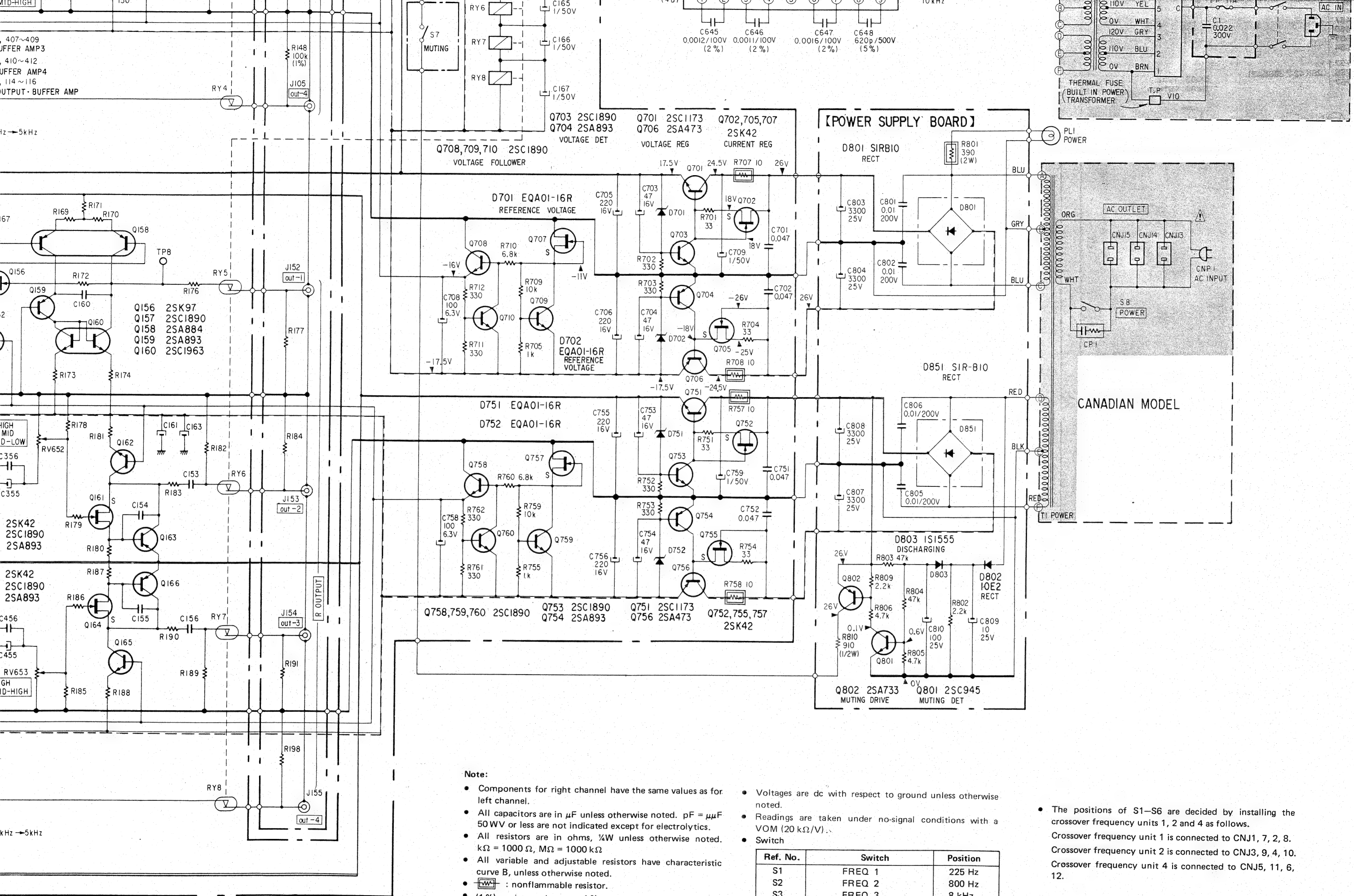


CROSSOVER FREQUENCY
1.25 kHz
2 kHz
2.5 kHz

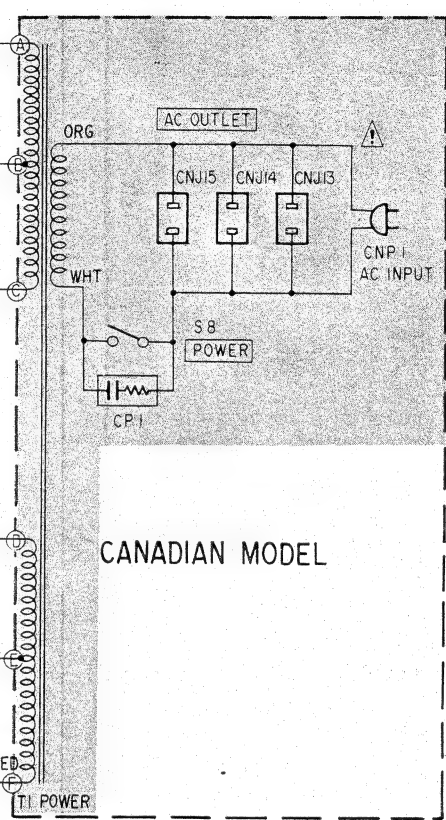
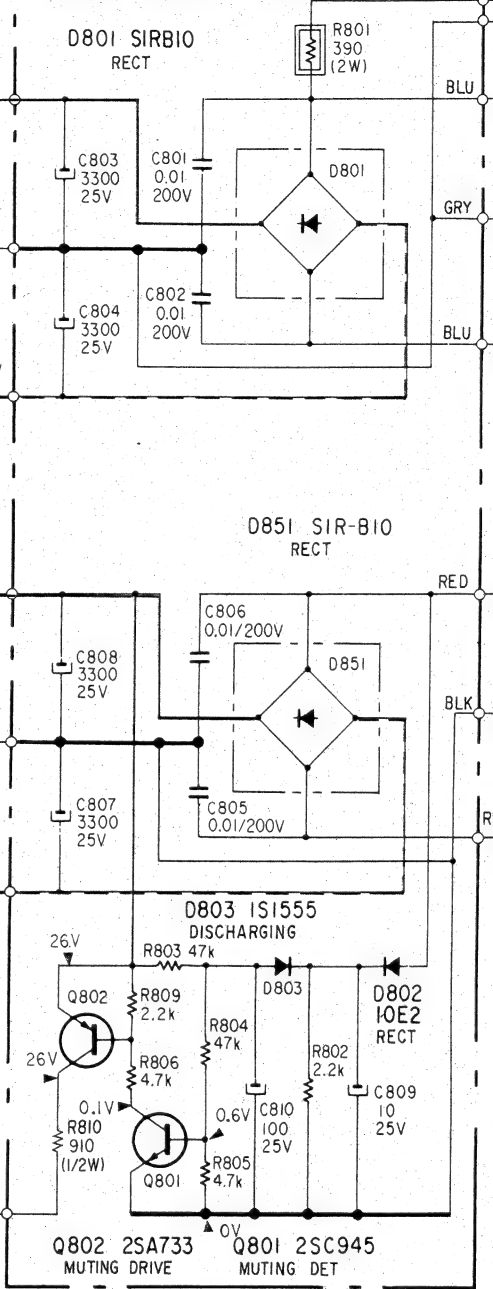


CROSSOVER FREQUENCY
5 kHz
8 kHz
10 kHz





[POWER SUPPLY BOARD]



Note:

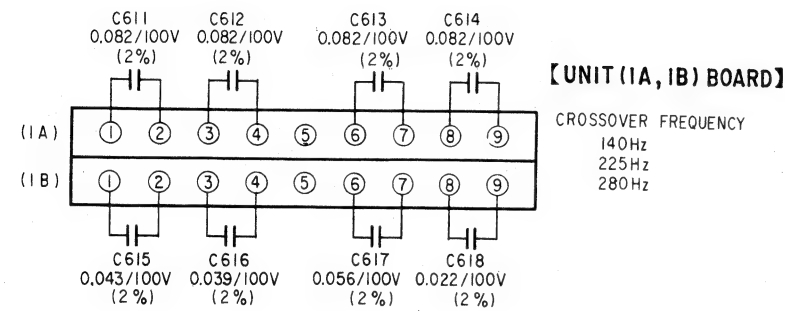
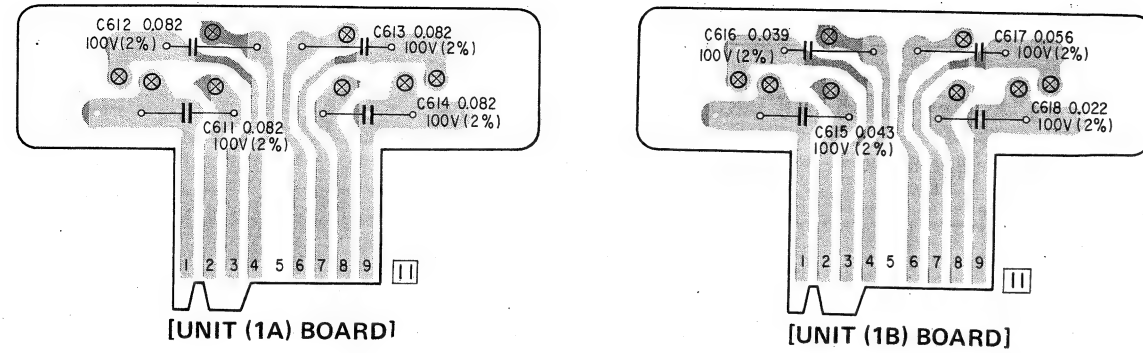
- Components for right channel have the same values as for left channel.
- All capacitors are in μF unless otherwise noted. $pF = \mu\mu F$. 50 WV or less are not indicated except for electrolytics.
- All resistors are in ohms, $\frac{1}{4}W$ unless otherwise noted. $k\Omega = 1000 \Omega$, $M\Omega = 1000 k\Omega$.
- All variable and adjustable resistors have characteristic curve B, unless otherwise noted.
- : nonflammable resistor.
- (1 %): resistor tolerance $\pm 1\%$
- (2 %): capacitor tolerance $\pm 2\%$
- : B+ bus.
- : B- bus.
- : panel designation.
- : adjustment for repair.
- Voltages are dc with respect to ground unless otherwise noted.
- Readings are taken under no-signal conditions with a VOM (20 $k\Omega/V$).
- Switch

Ref. No.	Switch	Position
S1	FREQ 1	225 Hz
S2	FREQ 2	800 Hz
S3	FREQ 3	8 kHz
S4	FREQ 4	225 Hz
S5	FREQ 2	800 Hz
S6	FREQ 3	8 kHz
S7	MUTING	OFF
S8	POWER	OFF

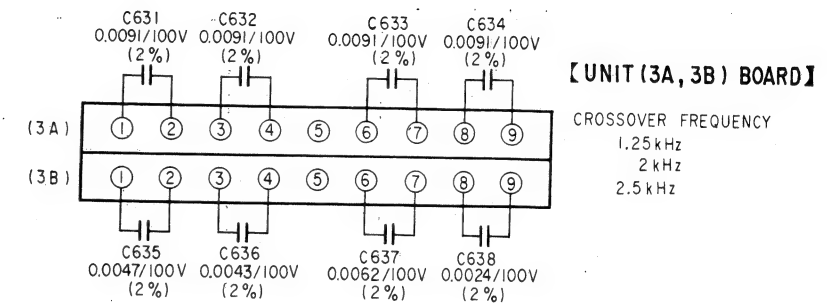
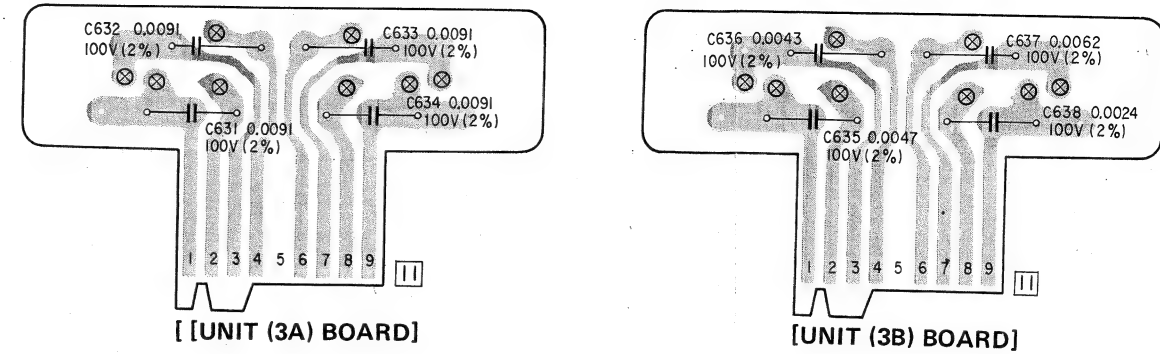
- The positions of S1—S6 are decided by installing the crossover frequency units 1, 2 and 4 as follows.
Crossover frequency unit 1 is connected to CNJ1, 7, 2, 8.
Crossover frequency unit 2 is connected to CNJ3, 9, 4, 10.
Crossover frequency unit 4 is connected to CNJ5, 11, 6, 12.

4-3. UNIT BOARD DIAGRAM

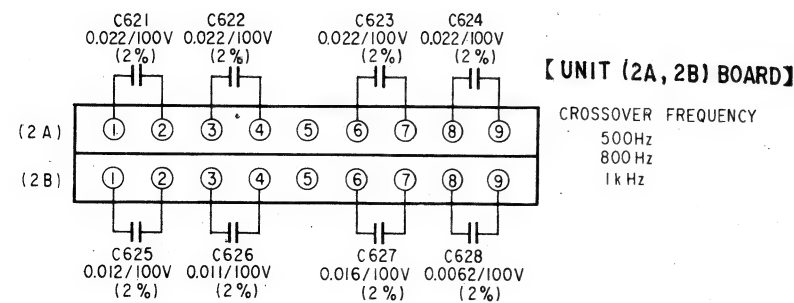
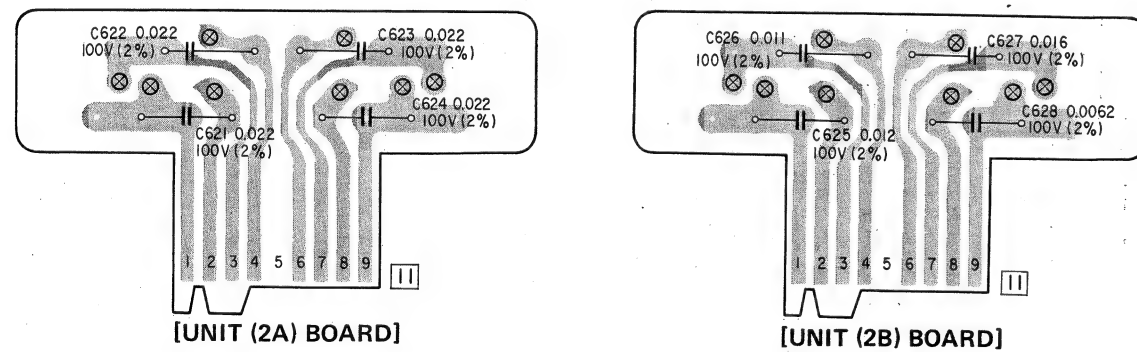
【UNIT (1A, 1B) BOARD】



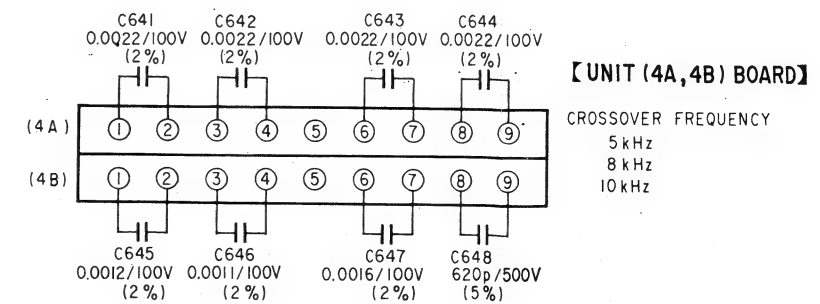
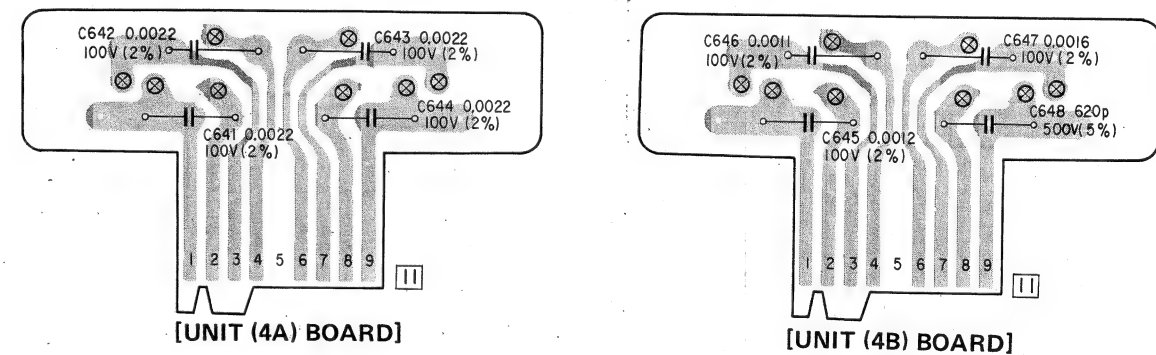
【UNIT (3A, 3B) BOARD】



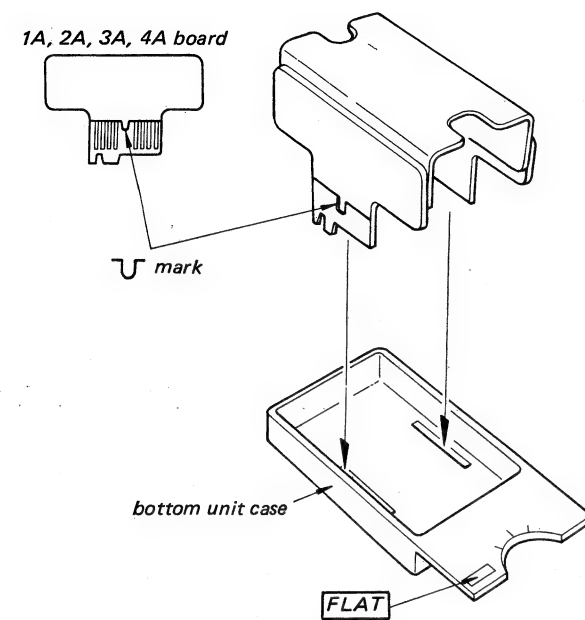
【UNIT (2A, 2B) BOARD】



【UNIT (4A, 4B) BOARD】



Note: Install the A board in the bottom unit case, face in the direction indicated.



SECTION 5
EXPLODED VIEWS

A B C D E F G

5-1.

A4464-083-A (C)
Unit (1) Ass'y, including
parts marked 1-4, 1

A4464-084-A (C)
Unit (2) Ass'y, including
parts marked 1-4, 1

A4464-086-A (C)
Unit (3) Ass'y, including
parts marked 1-4, 1
(Optional Accessory)

A4464-085-A (C)
Unit (4) Ass'y, including
parts marked 1-4, 1

4
1-586-854-00 (E)
Printed Circuit Board,
Unit 1B

4
1-586-856-00 (E)
Printed Circuit Board,
Unit 2B

4
1-586-858-00 (E)
Printed Circuit Board,
Unit 3B
(Optional Accessory)

4
1-586-860-00 (E)
Printed Circuit Board,
Unit 4B

1
4-854-402-00 (B)
Bracket, Unit

1
4-854-435-01 (B)
Unit Case (1), upper

1
4-854-435-11 (B)
Unit Case (2),
upper

1
4-854-435-21 (B)
Unit Case (3),
upper (Optional Accessory)

1
4-854-435-31 (B)
Unit Case (4), upper

2
4-854-422-31 (B)
Unit Case (4), bottom

2
4-854-422-01 (B)
Unit Case (1), bottom

2
4-854-422-11 (B)
Unit Case (2),
bottom

2
4-854-422-21 (B)
Unit Case (3), bottom
(Optional Accessory)

1-518-331-81 (B)
Lamp 6.0 V 35 mA;
POWER (PL1)

1-226-216-11 (F)
Resistor, variable 20 k Ω /20 k Ω ;
LEFT ATTENUATOR
(RV651-654)

1-552-294-12 (Canadian model)
1-552-295-12 (AEP model) (F)
Switch, rotary; POWER (S8)

4-852-933-00 (A)
Holder, lamp

3-703-108-21 (A)
BV 3 x 6, w/flange

3-831-441-XX (A)
Tape, t0.5

P 3 x 12

B 4 x 5

B 4 x 5

Bracket, front panel;
left

3-703-108-21 (A)
BV 3 x 6, w/flange

3-703-108-21 (A)
BV 3 x 6, w/flange

P 2.6 x 5

4-852-925-00 (A)
Lens, power lamp

X-4852-901-0 (E)
Knob Ass'y, POWER

SC4 x 4

SC4 x 4

4-852-923-00 (C)
Ornamental Ring,
POWER switch

X-4854-402-0 (C)
Knob Ass'y,
LEFT ATTENUATOR

X-4854-402-0 (C)
Knob Ass'y,
RIGHT ATTENUATOR

4-854-425-00 (C)
Panel, front

Bracket, front panel; right

B 4 x 5

BV 3 x 5

B 3 x 3

Sub-Chassis

X-4852-903-0 (B)
Foot Ass'y

BV 3 x 8

3-703-108-21 (A)
BV 3 x 6, w/flange

X-4852-903-0 (B)
Foot Ass'y

BV 3 x 8

3-703-108-21 (A)
BV 3 x 6, w/flange

4-854-427-00 (C)
Plate, bottom

1-226-216-11 (F)
Resistor, variable 20 k Ω /20 k Ω ;
RIGHT ATTENUATOR
(RV601-604)

4-847-802-00 (A)
Screw, case

4-854-434-00 (B)
Cushion, Unit

4-854-433-00 (A)
Cushion

4-854-437-00 (F)
Ornamental Plate

3-701-438-11 (A)
Washer, plastic; 2.5 mm dia.

4-854-403-00 (D)
Screw

X-4854-406-0 (G)
Cover Ass'y,
frequency response select

4-854-428-00 (J)
Cover, top

4-847-803-00 (A)
Screw, case

1
4-854-435-21 (B)
Unit Case (3),
upper (Optional Accessory)

1
4-854-435-31 (B)
Unit Case (4), upper

2
4-854-422-31 (B)
Unit Case (4), bottom

2
4-854-422-01 (B)
Unit Case (1), bottom

2
4-854-422-11 (B)
Unit Case (2),
bottom

2
4-854-422-21 (B)
Unit Case (3), bottom
(Optional Accessory)

1-518-331-81 (B)
Lamp 6.0 V 35 mA;
POWER (PL1)

1-226-216-11 (F)
Resistor, variable 20 k Ω /20 k Ω ;
LEFT ATTENUATOR
(RV651-654)

1-552-294-12 (Canadian model)
1-552-295-12 (AEP model) (F)
Switch, rotary; POWER (S8)

4-852-933-00 (A)
Holder, lamp

3-703-108-21 (A)
BV 3 x 6, w/flange

3-831-441-XX (A)
Tape, t0.5

P 3 x 12

B 4 x 5

B 4 x 5

Bracket, front panel;
left

3-703-108-21 (A)
BV 3 x 6, w/flange

3-703-108-21 (A)
BV 3 x 6, w/flange

P 2.6 x 5

4-852-925-00 (A)
Lens, power lamp

X-4852-901-0 (E)
Knob Ass'y, POWER

SC4 x 4

SC4 x 4

4-852-923-00 (C)
Ornamental Ring,
POWER switch

X-4854-402-0 (C)
Knob Ass'y,
LEFT ATTENUATOR

X-4854-402-0 (C)
Knob Ass'y,
RIGHT ATTENUATOR

4-854-425-00 (C)
Panel, front

Bracket, front panel; right

B 4 x 5

BV 3 x 5

B 3 x 3

Sub-Chassis

X-4852-903-0 (B)
Foot Ass'y

BV 3 x 8

3-703-108-21 (A)
BV 3 x 6, w/flange

X-4852-903-0 (B)
Foot Ass'y

BV 3 x 8

3-703-108-21 (A)
BV 3 x 6, w/flange

4-854-427-00 (C)
Plate, bottom

1-226-216-11 (F)
Resistor, variable 20 k Ω /20 k Ω ;
RIGHT ATTENUATOR
(RV601-604)

4-847-802-00 (A)
Screw, case

4-854-434-00 (B)
Cushion, Unit

4-854-433-00 (A)
Cushion

4-854-437-00 (F)
Ornamental Plate

3-701-438-11 (A)
Washer, plastic; 2.5 mm dia.

4-854-403-00 (D)
Screw

X-4854-406-0 (G)
Cover Ass'y,
frequency response select

4-854-428-00 (J)
Cover, top

4-847-803-00 (A)
Screw, case

1
4-854-435-21 (B)
Unit Case (3),
upper (Optional Accessory)

1
4-854-435-31 (B)
Unit Case (4), upper

2
4-854-422-31 (B)
Unit Case (4), bottom

2
4-854-422-01 (B)
Unit Case (1), bottom

2
4-854-422-11 (B)
Unit Case (2),
bottom

2
4-854-422-21 (B)
Unit Case (3), bottom
(Optional Accessory)

1-518-331-81 (B)
Lamp 6.0 V 35 mA;
POWER (PL1)

1-226-216-11 (F)
Resistor, variable 20 k Ω /20 k Ω ;
LEFT ATTENUATOR
(RV651-654)

1-552-294-12 (Canadian model)
1-552-295-12 (AEP model) (F)
Switch, rotary; POWER (S8)

4-852-933-00 (A)
Holder, lamp

3-703-108-21 (A)
BV 3 x 6, w/flange

3-831-441-XX (A)
Tape, t0.5

P 3 x 12

B 4 x 5

B 4 x 5

Bracket, front panel;
left

3-703-108-21 (A)
BV 3 x 6, w/flange

3-703-108-21 (A)
BV 3 x 6, w/flange

P 2.6 x 5

4-852-925-00 (A)
Lens, power lamp

X-4852-901-0 (E)
Knob Ass'y, POWER

SC4 x 4

SC4 x 4

4-852-923-00 (C)
Ornamental Ring,
POWER switch

X-4854-402-0 (C)
Knob Ass'y,
LEFT ATTENUATOR

X-4854-402-0 (C)
Knob Ass'y,
RIGHT ATTENUATOR

4-854-425-00 (C)
Panel, front

Bracket, front panel; right

B 4 x 5

BV 3 x 5

B 3 x 3

Sub-Chassis

X-4852-903-0 (B)
Foot Ass'y

BV 3 x 8

3-703-108-21 (A)
BV 3 x 6, w/flange

X-4852-903-0 (B)
Foot Ass'y

BV 3 x 8

3-703-108-21 (A)
BV 3 x 6, w/flange

4-854-427-00 (C)
Plate, bottom

1-226-216-11 (F)
Resistor, variable 20 k Ω /20 k Ω ;
RIGHT ATTENUATOR
(RV601-604)

4-847-802-00 (A)
Screw, case

4-854-434-00 (B)
Cushion, Unit

4-854-433-00 (A)
Cushion

4-854-437-00 (F)
Ornamental Plate

3-701-438-11 (A)
Washer, plastic; 2.5 mm dia.

4-854-403-00 (D)
Screw

X-4854-406-0 (G)
Cover Ass'y,
frequency response select

4-854-428-00 (J)
Cover, top

4-847-803-00 (A)
Screw, case

1
4-854-435-21 (B)
Unit Case (3),
upper (Optional Accessory)

1
4-854-435-31 (B)
Unit Case (4), upper

2
4-854-422-31 (B)
Unit Case (4), bottom

2
4-854-422-01 (B)
Unit Case (1), bottom

2
4-854-422-11 (B)
Unit Case (2),
bottom

2
4-854-422-21 (B)
Unit Case (3), bottom
(Optional Accessory)

1-518-331-81 (B)
Lamp 6.0 V 35 mA;
POWER (PL1)

1-226-216-11 (F)
Resistor, variable 20 k Ω /20 k Ω ;
LEFT ATTENUATOR
(RV651-654)

1-552-294-12 (Canadian model)
1-552-295-12 (AEP model) (F)
Switch, rotary; POWER (S8)

4-852-933-00 (A)
Holder, lamp

3-703-108-21 (A)
BV 3 x 6, w/flange

3-831-441-XX (A)
Tape, t0.5

P 3 x 12

B 4 x 5

B 4 x 5

Bracket, front panel;
left

3-703-108-21 (A)
BV 3 x 6, w/flange

3-703-108-21 (A)
BV 3 x 6, w/flange

P 2.6 x 5

4-852-925-00 (A)
Lens, power lamp

X-4852-901-0 (E)
Knob Ass'y, POWER

SC4 x 4

SC4 x 4

4-852-923-00 (C)
Ornamental Ring,
POWER switch

X-4854-402-0 (C)
Knob Ass'y,
LEFT ATTENUATOR

X-4854-402-0 (C)
Knob Ass'y,
RIGHT ATTENUATOR

4-854-425-00 (C)
Panel, front

Bracket, front panel; right

B 4 x 5

BV 3 x 5

B 3 x 3

Sub-Chassis

X-4852-903-0 (B)
Foot Ass'y

BV 3 x 8

3-703-108-21 (A)
BV 3 x 6, w/flange

X-4852-903-0 (B)
Foot Ass'y

BV 3 x 8

3-703-108-21 (A)
BV 3 x 6, w/flange

4-854-427-00 (C)
Plate, bottom

1-226-216-11 (F)
Resistor, variable 20 k Ω /20 k Ω ;
RIGHT ATTENUATOR
(RV601-604)

4-847-802-00 (A)
Screw, case

4-854-434-00 (B)
Cushion, Unit

4-854-433-00 (A)
Cushion

4-854-437-00 (F)
Ornamental Plate

3-701-438-11 (A)
Washer, plastic; 2.5 mm dia.

4-854-403-00 (D)
Screw

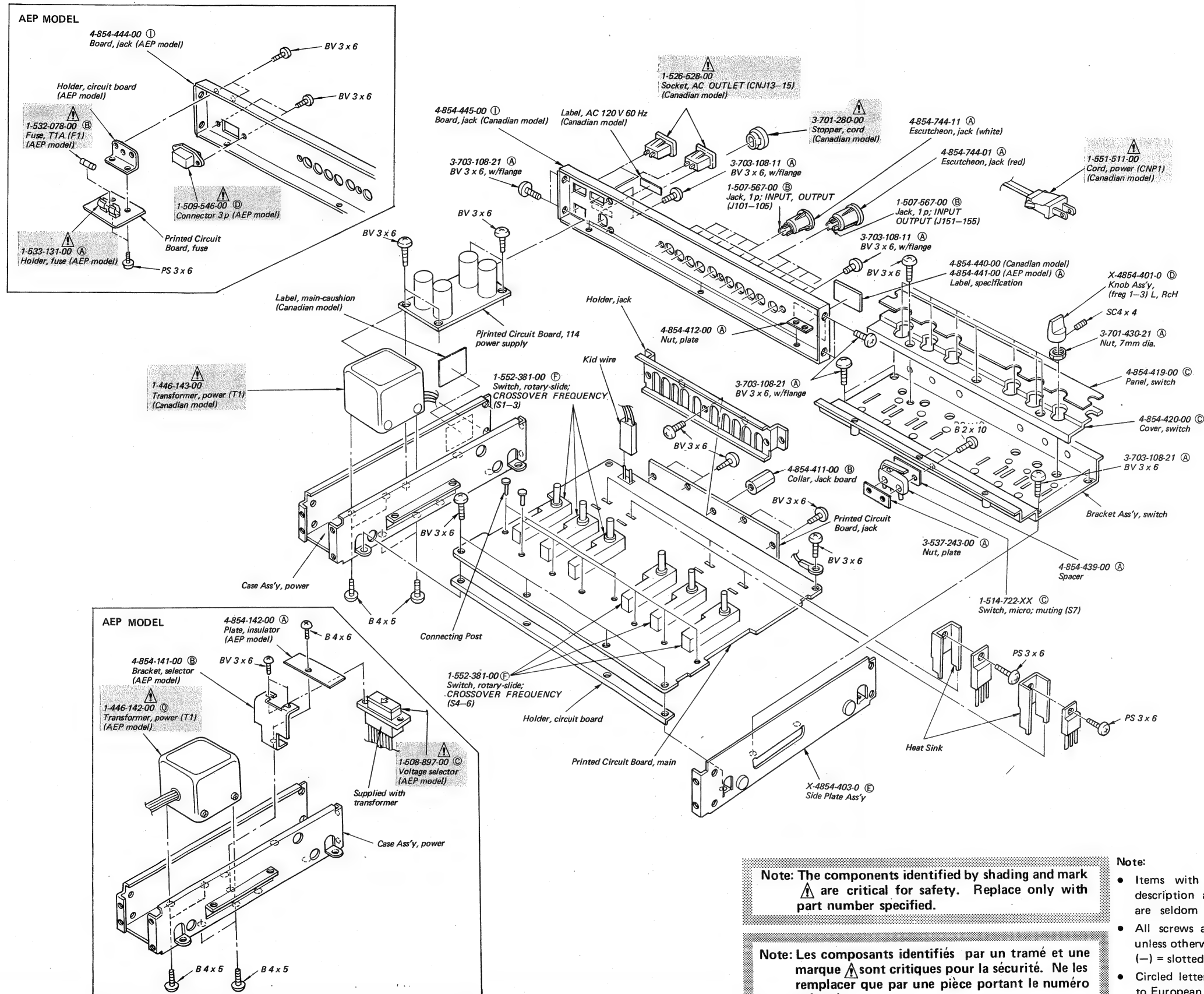
X-4854-406-0 (G)
Cover Ass'y,
frequency response select

4-854-428-00 (J)
Cover, top

4-847-803-00 (A)
Screw, case

1
4-854-435-21 (B)
Unit Case (3),
upper (Optional Accessory)

5-2.



Note: The components identified by shading and mark are critical for safety. Replace only with part number specified.

Note: Les composants identifiés par un trame et une marque sont critiques pour la sécurité. Ne les remplacer que par une pièce portant le numéro spécifié.

Note:

- Items with no part number and/or no description are not stocked because they are seldom required for routine service.
- All screws are Phillips (cross recess) type unless otherwise noted.
(-) = slotted head
- Circled letters (① to ㉚) are applicable to European models only.

SECTION 6

ELECTRICAL PARTS LIST

Note: Circled letters (A) to (Z) are applicable to European models only.

Ref. No. Part No. Description

PRINTED CIRCUIT BOARDS

1-586-853-00 (E) Unit 1A
 1-586-854-00 (E) Unit 1B
 1-586-855-00 (E) Unit 2A
 1-586-856-00 (E) Unit 2B
 1-586-857-00 (E) Unit 3A

1-586-858-00 (E) Unit 3B
 1-586-859-00 (E) Unit 4A
 1-586-860-00 (E) Unit 4B

SEMICONDUCTORS**Transistors**

Q101, 151 8-765-342-31 (F) 2SK97
 ⇒ Q102, 152 8-720-950-03 (C) 2SC926A
 Q103, 153 8-765-020-00 (D) 2SA884
 ⇒ Q104, 154 8-729-163-93 (C) 2SA639S
 Q105, 155 8-765-222-20 (D) 2SC1963

Q106, 156 8-765-342-31 (F) 2SK97
 ⇒ Q107, 157 8-720-950-03 (C) 2SC926A
 Q108, 158 8-765-020-00 (D) 2SA884
 ⇒ Q109, 159 8-729-163-93 (C) 2SA639S
 Q110, 160 8-765-222-20 (D) 2SC1963

⇒ Q111, 161 8-727-314-00 (E) 2SK42-4
 ⇒ Q112, 162 8-720-950-03 (C) 2SC926A
 ⇒ Q113, 163 8-729-163-93 (C) 2SA639S
 ⇒ Q114, 164 8-727-314-00 (E) 2SK42-4
 ⇒ Q115, 165 8-720-950-03 (C) 2SC926A

⇒ Q116, 166 8-729-163-93 (C) 2SA639S
 ⇒ Q117, 167 8-727-314-00 (E) 2SK42-4
 ⇒ Q118, 168 8-720-950-03 (C) 2SC926A
 ⇒ Q119, 169 8-729-163-93 (C) 2SA639S

Q201, 251 8-765-342-31 (F) 2SK97
 ⇒ Q202, 252 8-720-950-03 (C) 2SC926A
 Q203, 253 8-765-020-00 (D) 2SA884
 ⇒ Q204, 254 8-729-163-93 (C) 2SA639S
 Q205, 255 8-765-222-20 (D) 2SC1963

Q206, 256 8-765-342-31 (F) 2SK97
 ⇒ Q207, 257 8-720-950-03 (C) 2SC926A
 Q208, 258 8-765-020-00 (D) 2SA884

Ref. No. Part No. Description

⇒ Q209, 259 8-729-163-93 (C) 2SA639S
 Q210, 260 8-765-222-20 (D) 2SC1963

⇒ Q301, 351 8-727-314-00 (E) 2SK42-4
 ⇒ Q302, 352 8-720-950-03 (C) 2SC926A
 ⇒ Q303, 353 8-729-163-93 (C) 2SA639S
 ⇒ Q304, 354 8-727-314-00 (E) 2SK42-4
 ⇒ Q305, 355 8-720-950-03 (C) 2SC926A

⇒ Q306, 356 8-729-163-93 (C) 2SA639S
 ⇒ Q307, 357 8-727-314-00 (E) 2SK42-4
 ⇒ Q308, 358 8-720-950-03 (C) 2SC926A
 ⇒ Q309, 359 8-729-163-93 (C) 2SA639S
 ⇒ Q310, 360 8-727-314-00 (E) 2SK42-4

⇒ Q311, 361 8-720-950-03 (C) 2SC926A
 ⇒ Q312, 362 8-729-163-93 (C) 2SA639S

⇒ Q401, 451 8-727-314-00 (E) 2SK42-4
 ⇒ Q402, 452 8-720-950-03 (C) 2SC926A
 ⇒ Q403, 453 8-729-163-93 (C) 2SA639S
 ⇒ Q404, 454 8-727-314-00 (E) 2SK42-4
 ⇒ Q405, 455 8-720-950-03 (C) 2SC926A

⇒ Q406, 456 8-729-163-93 (C) 2SA639S
 ⇒ Q407, 457 8-727-314-00 (E) 2SK42-4
 ⇒ Q408, 458 8-720-950-03 (C) 2SC926A
 ⇒ Q409, 459 8-729-163-93 (C) 2SA639S
 ⇒ Q410, 460 8-727-314-00 (E) 2SK42-4

⇒ Q411, 461 8-720-950-03 (C) 2SC926A
 ⇒ Q412, 462 8-729-163-93 (C) 2SA639S

⇒ Q501, 551 8-727-314-00 (E) 2SK42-4
 ⇒ Q502, 552 8-720-950-03 (C) 2SC926A
 ⇒ Q503, 553 8-729-163-93 (C) 2SA639S
 ⇒ Q504, 554 8-727-314-00 (E) 2SK42-4
 ⇒ Q505, 555 8-720-950-03 (C) 2SC926A

⇒ Q506, 556 8-729-163-93 (C) 2SA639S

⇒: Due to standardization, interchangeable replacements may be substituted for parts specified in the diagrams.

Note: Circled letters (A to Z) are applicable to European models only.

Ref. No.	Part No.	Description
Q701, 751	8-729-217-33	© 2SC1173
⇒Q702, 752	8-727-312-00	© 2SK42-2
⇒Q703, 753	8-720-950-03	© 2SC926A
⇒Q704, 754	8-729-163-93	© 2SA639S
⇒Q705, 755	8-727-312-00	© 2SK42-2
Q706, 756	8-729-247-33	© 2SA473
⇒Q707, 757	8-727-312-00	© 2SK42-2
⇒Q708-710	8-729-950-03	© 2SC926A
⇒Q758-760		
⇒Q801	8-729-663-47	© 2SC1364
⇒Q802	8-727-788-00	© 2SA678

Diodes

⇒D701, 751	8-719-931-16	© EQB01-16
⇒D702, 752		
D801, 851	8-719-510-10	© S1RB10
D802	8-719-200-02	© 10E2
D803	8-719-815-55	© 1S1555

CAPACITORS

All capacitors are in μF and polyethylene unless otherwise noted. 5WV or less are not indicated except for electrolytics. $\text{pF} = \mu\text{F}$, elect = electrolytic

C1	1-108-777-11	© 0.022	300 V	metalized film (AEP model)
C101, 151	1-109-170-11	© 0.001	300 V	mica
C102, 152	1-107-159-11	© 33 p	500 V	silvered mica
C103, 153	1-130-083-11	© 1	100 V	
C104, 154	1-107-159-11	© 33 p	500 V	silvered mica
C105, 155				
C106, 156	1-130-083-11	© 1	100 V	
C107, 157				
C108, 158	1-107-159-11	© 33 p	500 V	silvered mica
C109, 159	1-109-170-11	© 0.001	300 V	mica
C110, 160	1-107-159-11	© 33 p	500 V	silvered mica
C111, 161	1-121-391-11	© 1	50 V	elect
C112, 162				
C113, 163	1-121-415-11	© 100	16 V	elect

⇒: Due to standardization, interchangeable replacements may be substituted for parts specified in the diagrams.

Note: Les composants identifiés par un trame et une marque A sont critiques pour la sécurité. Ne les remplacer que par une pièce portant le numéro spécifié.

C114-117	1-121-391-11	© 1	50 V	elect
C164-167				
C201, 251	1-109-170-11	© 0.001	300 V	mica
C202, 252	1-107-159-11	© 33 p	500 V	silvered mica
C203, 253	1-109-170-11	© 0.001	300 V	mica
C204, 254	1-107-159-11	© 33 p	500 V	silvered mica
C301-304	1-107-159-11	© 33 p	500 V	silvered mica
C351-354				
C305, 355	1-131-371-11	© 10	16 V	tantalum
C306, 356	1-130-127-11	© 0.015	100 V	
C401-404	1-107-159-11	© 33 p	500 V	silvered mica
C451-454				
C405, 455	1-131-371-11	© 10	16 V	tantalum
C406, 456	1-130-127-11	© 0.015	100 V	
C501, 502	1-107-159-11	© 33 p	500 V	silvered mica
C551, 552				
C503, 553	1-131-371-11	© 10	16 V	tantalum
C504, 554	1-130-127-11	© 0.015	100 V	
C611-614	1-130-175-11	© 0.082	100 V	
C615	1-130-174-11	© 0.043	100 V	
C616	1-130-173-11	© 0.039	100 V	
C617	1-130-126-11	© 0.056	100 V	
C618	1-130-172-11	© 0.022	100 V	
C621-624	1-130-172-11	© 0.022	100 V	
C625	1-130-171-11	© 0.012	100 V	
C626	1-130-170-11	© 0.011	100 V	
C627	1-130-125-11	© 0.016	100 V	
C628	1-130-168-11	© 0.0062	100 V	
C631-634	1-130-169-11	© 0.0091	100 V	
C635	1-130-167-11	© 0.0047	100 V	
C636	1-130-123-11	© 0.0043	100 V	
C637	1-130-168-11	© 0.0062	100 V	
C638	1-130-166-11	© 0.0024	100 V	
C641-644	1-130-165-11	© 0.0022	100 V	
C645	1-130-164-11	© 0.0012	100 V	
C646	1-130-163-11	© 0.0011	100 V	
C647	1-130-131-11	© 0.0016	100 V	
C648	1-109-692-11	© 620 p	500 V	mica

Note: The components identified by shading and mark A are critical for safety. Replace only with part number specified.

Note: Circled letters (A to Z) are applicable to European models only.

<u>Ref. No.</u>	<u>Part No.</u>	<u>Description</u>		
C701, 751 C702, 752 C703, 753 C704, 754	1-102-246-11	(A) 0.047	mylar	
C705, 755 C706, 756	1-123-192-11	(A) 47	16 V	elect
C708, 758 C709, 759	1-123-068-11	(B) 220	16 V	elect
	1-123-196-11	(A) 100	6.3 V	elect
	1-121-391-11	(A) 1	50 V	elect
C801, 802 C803, 804 C805, 806 C807, 808 C809 C810	1-108-421-12	(B) 0.01	200 V	mylar
	1-123-246-11	(D) 3300	25 V	elect
	1-108-421-12	(B) 0.01	200 V	mylar
	1-123-246-11	(D) 3300	25	elect
	1-121-398-11	(A) 10	25 V	elect
	1-121-935-11	(B) 100	25 V	elect

RESISTORS

All resistors are in ohms. Common ¼W carbon resistors are omitted. Refer to the list on page 31 for their part numbers.

R101, 151 R127, 177 R134, 184 R141, 191 R148, 198	1-214-173-11	(A) 51 k	¼ W	metal oxide
	1-214-180-11	(A) 100 k	¼ W	metal oxide
R201, 251 R202, 252 R203, 253 R204, 254 R205, 255	1-214-156-11	(A) 10 k	¼ W	metal oxide
	1-214-159-11	(A) 13 k	¼ W	metal oxide
	1-214-163-11	(A) 20 k	¼ W	metal oxide
	1-214-156-11	(A) 10 k	¼ W	metal oxide
	1-214-159-11	(A) 13 k	¼ W	metal oxide
R206, 256 R207, 257 R208, 258 R209, 259 R210, 260	1-214-163-11	(A) 20 k	¼ W	metal oxide
	1-214-156-11	(A) 10 k	¼ W	metal oxide
	1-214-159-11	(A) 13 k	¼ W	metal oxide
	1-214-163-11	(A) 20 k	¼ W	metal oxide
	1-214-156-11	(A) 10 k	¼ W	metal oxide
R211, 261 R212, 262	1-214-159-11	(A) 13 k	¼ W	metal oxide
	1-214-163-11	(A) 20 k	¼ W	metal oxide
R301, 351 R302, 352 R303, 353 R304, 354 R305, 355	1-214-156-11	(A) 10 k	¼ W	metal oxide
	1-214-158-11	(A) 12 k	¼ W	metal oxide
	1-214-163-11	(A) 20 k	¼ W	metal oxide
	1-214-158-11	(A) 12 k	¼ W	metal oxide
	1-214-160-11	(A) 15 k	¼ W	metal oxide

R306, 356 R307, 357 R308, 358 R309, 359 R310, 360	1-214-165-11	(A) 24 k	¼ W	metal oxide
	1-214-153-11	(A) 7.5 k	¼ W	metal oxide
	1-214-155-11	(A) 9.1 k	¼ W	metal oxide
	1-214-160-11	(A) 15 k	¼ W	metal oxide
	1-214-162-11	(A) 18 k	¼ W	metal oxide
R311, 362 R312, 362 R313, 363 R314, 364 R315, 365	1-214-165-11	(A) 24 k	¼ W	metal oxide
	1-214-169-11	(A) 36 k	¼ W	metal oxide
	1-214-156-11	(A) 10 k	¼ W	metal oxide
	1-214-159-11	(A) 13 k	¼ W	metal oxide
	1-214-163-11	(A) 20 k	¼ W	metal oxide
R316, 366 R317, 367 R318, 368 R319, 369 R320, 370	1-214-156-11	(A) 10 k	¼ W	metal oxide
	1-214-159-11	(A) 13 k	¼ W	metal oxide
	1-214-163-11	(A) 20 k	¼ W	metal oxide
	1-214-156-11	(A) 10 k	¼ W	metal oxide
	1-214-159-11	(A) 13 k	¼ W	metal oxide
R321, 371 R322, 372 R323, 373 R324, 374	1-214-163-11	(A) 20 k	¼ W	metal oxide
	1-214-156-11	(A) 10 k	¼ W	metal oxide
	1-214-159-11	(A) 13 k	¼ W	metal oxide
	1-214-163-11	(A) 20 k	¼ W	metal oxide
R401, 451 R402, 452 R403, 453 R404, 454 R405, 455	1-214-156-11	(A) 10 k	¼ W	metal oxide
	1-214-158-11	(A) 12 k	¼ W	metal oxide
	1-214-163-11	(A) 20 k	¼ W	metal oxide
	1-214-158-11	(A) 12 k	¼ W	metal oxide
	1-214-160-11	(A) 15 k	¼ W	metal oxide
R406, 456 R407, 457 R408, 458 R409, 459 R410, 460	1-214-165-11	(A) 24 k	¼ W	metal oxide
	1-214-153-11	(A) 7.5 k	¼ W	metal oxide
	1-214-155-11	(A) 9.1 k	¼ W	metal oxide
	1-214-160-11	(A) 15 k	¼ W	metal oxide
	1-214-162-11	(A) 18 k	¼ W	metal oxide
R411, 461 R412, 462 R413, 463 R414, 464 R415, 465	1-214-165-11	(A) 24 k	¼ W	metal oxide
	1-214-169-11	(A) 36 k	¼ W	metal oxide
	1-214-156-11	(A) 10 k	¼ W	metal oxide
	1-214-159-11	(A) 13 k	¼ W	metal oxide
	1-214-163-11	(A) 20 k	¼ W	metal oxide
R416, 466 R417, 467 R418, 468 R419, 469 R420, 470	1-214-156-11	(A) 10 k	¼ W	metal oxide
	1-214-159-11	(A) 13 k	¼ W	metal oxide
	1-214-163-11	(A) 20 k	¼ W	metal oxide
	1-214-156-11	(A) 10 k	¼ W	metal oxide
	1-214-159-11	(A) 13 k	¼ W	metal oxide

Note: Circled letters (A to Z) are applicable to European models only.

Ref. No.	Part No.	Description
R421, 471	1-214-163-11 A 20 k ¼ W	metal oxide
R422, 472	1-214-156-11 A 10 k ¼ W	metal oxide
R423, 473	1-214-159-11 A 13 k ¼ W	metal oxide
R424, 474	1-214-163-11 A 20 k ¼ W	metal oxide
R501, 551	1-214-156-11 A 10 k ¼ W	metal oxide
R502, 552	1-214-158-11 A 12 k ¼ W	metal oxide
R503, 553	1-214-163-11 A 20 k ¼ W	metal oxide
R504, 554	1-214-158-11 A 12 k ¼ W	metal oxide
R505, 555	1-214-160-11 A 15 k ¼ W	metal oxide
R506, 556	1-214-165-11 A 24 k ¼ W	metal oxide
R507, 557	1-214-153-11 A 7.5 k ¼ W	metal oxide
R508, 558	1-214-155-11 A 9.1 k ¼ W	metal oxide
R509, 559	1-214-160-11 A 15 k ¼ W	metal oxide
R510, 560	1-214-162-11 A 18 k ¼ W	metal oxide
R511, 561	1-214-165-11 A 24 k ¼ W	metal oxide
R512, 562	1-214-169-11 A 36 k ¼ W	metal oxide
R707, 757 R708, 758	1-211-498-11 A 10 ¼ W	carbon (nonflammable)
R801	1-206-654-11 A 390 2 W	metal oxide (nonflammable)
R810	1-244-872-11 A 910 ½ W	Carbon
RV601-604 RV651-654	1-226-216-11 F 20 k/20 k, variable; LEFT, RIGHT ATTENUATOR	
RT101, 151 RT102, 152 RT201, 251 RT202, 252	1-224-247-XX C 100 Ω, adjustable; offset	

SWITCHES

S1-6	1-552-381-00 F Rotary-Slide; CROSSOVER FREQUENCY
S7	1-514-722-XX C Microswitch; muting
S8	A 1-552-294-12 Rotary; POWER (Canadian model)
S8	A 1-552-295-12 G Rotary; POWER (AEP model)

Ref. No. Part No. Description

MISCELLANEOUS

CNJ1-12	1-561-141-00 C Connector, circuit board
CNJ13-15	A 1-526-528-00 Socket; AC OUTLET (Canadian model)
CNP1	A 1-551-511-00 Cord, power (Canadian model)
CP1	A 1-231-341-00 D Spark-killer (Canadian model)
F1	A 1-532-078-00 B Fuse T1A (AEP model)
J101-105 J151-155	1-507-567-00 B Jack, 1 P; INPUT, OUTPUT
PL1	1-518-331-81 B Lamp, 6.0 V 35 mA; power
RY1-8	1-515-314-00 E Relay
T1	A 1-446-143-00 Transformer, power (Canadian model)
T1	A 1-446-142-00 Q Transformer, power (AEP model)
	A 1-508-897-00 C Voltage Selector (AEP model)
	A 1-509-546-00 D Connector, 3 p AC IN (AEP model)
	A 1-533-131-00 A Holder, fuse (AEP model)

ACCESSORY AND PACKING MATERIALS

Part No.	Description
A-4464-086-A	Q Unit (3) Ass'y
1-551-315-00	H Cord, connecting; RK-112
1-551-315-21	H Cord, connecting; RK-113
3-701-020-00	A Bag, check sheet
3-701-622-11	A Bag, polyethylene
3-770-360-11	Manual, instruction (AEP model)
3-770-360-21 3-794-300-31	Manual, instruction (Canadian model)
4-809-251-00	A Bag, protection
4-852-949-00	C Cushion
4-854-431-00	C Box, accessory
4-854-432-00	C Case, unit

Note: The components identified by shading and mark A are critical for safety. Replace only with part number specified.

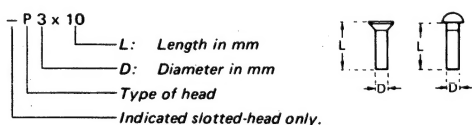
Note: Les composants identifiés par un tramé et une marque A sont critiques pour la sécurité. Ne les remplacer que par une pièce portant le numéro spécifié.

1/4 WATT CARBON RESISTORS [Ⓐ]Note: Circled letter [Ⓐ] is applicable to European models only.

Ω	Part No.	Ω	Part No.	Ω	Part No.	Ω	Part No.	Ω	Part No.	Ω	Part No.
1.0	1-244-601-11	10	1-244-625-11	100	1-244-649-11	1.0k	1-244-673-11	10k	1-244-697-11	100k	1-244-721-11
1.1	1-244-602-11	11	1-244-626-11	110	1-244-650-11	1.1k	1-244-674-11	11k	1-244-698-11	110k	1-244-722-11
1.2	1-244-603-11	12	1-244-627-11	120	1-244-651-11	1.2k	1-244-675-11	12k	1-244-699-11	120k	1-244-723-11
1.3	1-244-604-11	13	1-244-628-11	130	1-244-652-11	1.3k	1-244-676-11	13k	1-244-700-11	130k	1-244-724-11
1.5	1-244-605-11	15	1-244-629-11	150	1-244-653-11	1.5k	1-244-677-11	15k	1-244-701-11	150k	1-244-725-11
1.6	1-244-606-11	16	1-244-630-11	160	1-244-654-11	1.6k	1-244-678-11	16k	1-244-702-11	160k	1-244-726-11
1.8	1-244-607-11	18	1-244-631-11	180	1-244-655-11	1.8k	1-244-679-11	18k	1-244-703-11	180k	1-244-727-11
2.0	1-244-608-11	20	1-244-632-11	200	1-244-656-11	2.0k	1-244-680-11	20k	1-244-704-11	200k	1-244-728-11
2.2	1-244-609-11	22	1-244-633-11	220	1-244-657-11	2.2k	1-244-681-11	22k	1-244-705-11	220k	1-244-729-11
2.4	1-244-610-11	24	1-244-634-11	240	1-244-658-11	2.4k	1-244-682-11	24k	1-244-706-11	240k	1-244-730-11
2.7	1-244-611-11	27	1-244-635-11	270	1-244-659-11	2.7k	1-244-683-11	27k	1-244-707-11	270k	1-244-731-11
3.0	1-244-612-11	30	1-244-636-11	300	1-244-660-11	3.0k	1-244-684-11	30k	1-244-708-11	300k	1-244-732-11
3.3	1-244-613-11	33	1-244-637-11	330	1-244-661-11	3.3k	1-244-685-11	33k	1-244-709-11	330k	1-244-733-11
3.6	1-244-614-11	36	1-244-638-11	360	1-244-662-11	3.6k	1-244-686-11	36k	1-244-710-11	360k	1-244-734-11
3.9	1-244-615-11	39	1-244-639-11	390	1-244-663-11	3.9k	1-244-687-11	39k	1-244-711-11	390k	1-244-735-11
4.3	1-244-616-11	43	1-244-640-11	430	1-244-664-11	4.3k	1-244-688-11	43k	1-244-712-11	430k	1-244-736-11
4.7	1-244-617-11	47	1-244-641-11	470	1-244-665-11	4.7k	1-244-689-11	47k	1-244-713-11	470k	1-244-737-11
5.1	1-244-618-11	51	1-244-642-11	510	1-244-666-11	5.1k	1-244-690-11	51k	1-244-714-11	510k	1-244-738-11
5.6	1-244-619-11	56	1-244-643-11	560	1-244-667-11	5.6k	1-244-691-11	56k	1-244-715-11	560k	1-244-739-11
6.2	1-244-620-11	62	1-244-644-11	620	1-244-668-11	6.2k	1-244-692-11	62k	1-244-716-11	620k	1-244-740-11
6.8	1-244-621-11	68	1-244-645-11	680	1-244-669-11	6.8k	1-244-693-11	68k	1-244-717-11	680k	1-244-741-11
7.5	1-244-622-11	75	1-244-646-11	750	1-244-670-11	7.5k	1-244-694-11	75k	1-244-718-11	750k	1-244-742-11
8.2	1-244-623-11	82	1-244-647-11	820	1-244-671-11	8.2k	1-244-695-11	82k	1-244-719-11	820k	1-244-743-11
9.1	1-244-624-11	91	1-244-648-11	910	1-244-672-11	9.1k	1-244-696-11	91k	1-244-720-11	910k	1-244-744-11

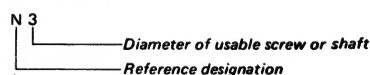
HARDWARE NOMENCLATURE

Screw:



Unless otherwise indicated, it means cross-recessed head (Phillips type).

Nut, Washer, Retaining ring:



Reference Designation	Shape	Description	Remarks
SCREWS			
P		pan-head screw	binding-head (B) screw for replacement
PWH		pan-head screw with washer face	binding-head (B) screw and flat washer for replacement
PS PSP		pan-head screw with spring washer	binding-head (B) screw and spring washer for replacement
PSW PSPW		pan-head screw with spring and flat washers	binding-head (B) screw and spring and flat washers for replacement
R		round-head screw	binding-head (B) screw for replacement
K		flat-countersunk-head screw	
RK		oval-countersunk-head screw	
B		binding-head screw	
T		truss-head screw	binding-head (B) screw for replacement
F		flat-fillister-head screw	
RF		fillister-head screw	
BV		brazer-head screw	

Reference Designation	Shape	Description	Remarks
SELF-TAPPING SCREWS			
TA		self-tapping screw	ex: TA, P 3 x 10
PTP		pan-head self-tapping screw	binding-head self-tapping (TA, B) screw for replacement
PTPWH		pan-head self-tapping screw with washer face	binding-head self-tapping (TA, B) screw and flat washer for replacement
PTTWH		pan-head thread-rolling screw with washer face	binding-head (B) screw and flat washer for replacement
SET SCREWS			
SC		set screw	
SC		hexagon-socket set screw	ex: SC 2.6 x 4, hexagon socket
NUT			
N		nut	
WASHERS			
W		flat washer	
SW		spring washer	
LW		internal-tooth lock washer	ex: LW3, internal
LW		external-tooth lock washer	ex: LW3, external
RETAINING RINGS			
E		retaining ring	
G		grip-type retaining ring	